REFINER
AND NATURAL GASOLINE MANUFACTURER
A GULF PUBLISHING COMPANY PUBLICATION

VOLUME 11, No. 12 DECEMBER, 1932

Stop Looking at 1929 . . . Look Ahead

AMERICAN business seems finally to have realized that no miraculous event will restore the days that went over the economic precipice in the autumn of 1929. Part of the thought of the past three years has been given over to such anticipation. Business has been fearful of the future but hopeful of a miracle.

That such hope was foolish, even when it prevailed, was evident. Destruction always is swifter than construction. Whether the task is that of forming character, expanding a corporation or erecting a building, tearing down is but a moment when compared with building up. In difficulty of ascent and rapidity of descent the economic hill and the economic cliff are identical with the physical mountain and the physical precipice.

The style of the drop from the autumn of 1929 would indicate that business has several years of climbing ahead of it. It was not one precipice, but several, down which business tumbled. The stock market crash was the explosion of one. European nations had the gold standard pulled from under their footing and that was another roll for American business. There was the rattle of small banks as they clattered like dominoes set on end and business hit a lower level. Finally Congress looked too long upon measures of inflation, while gold beat a path across the Atlantic ocean and again American business went down without aid of a parachute.

While these events came about men held to the vain hope that the upward move would be vertical like the declines. Now that these drops have been suffered without collapse, men are reconciled to the return by easier grades and longer time. If it has taken three years for the total decline, no man seems willing to predict the period essential for the climb. Predictions at last are few and of little influence.

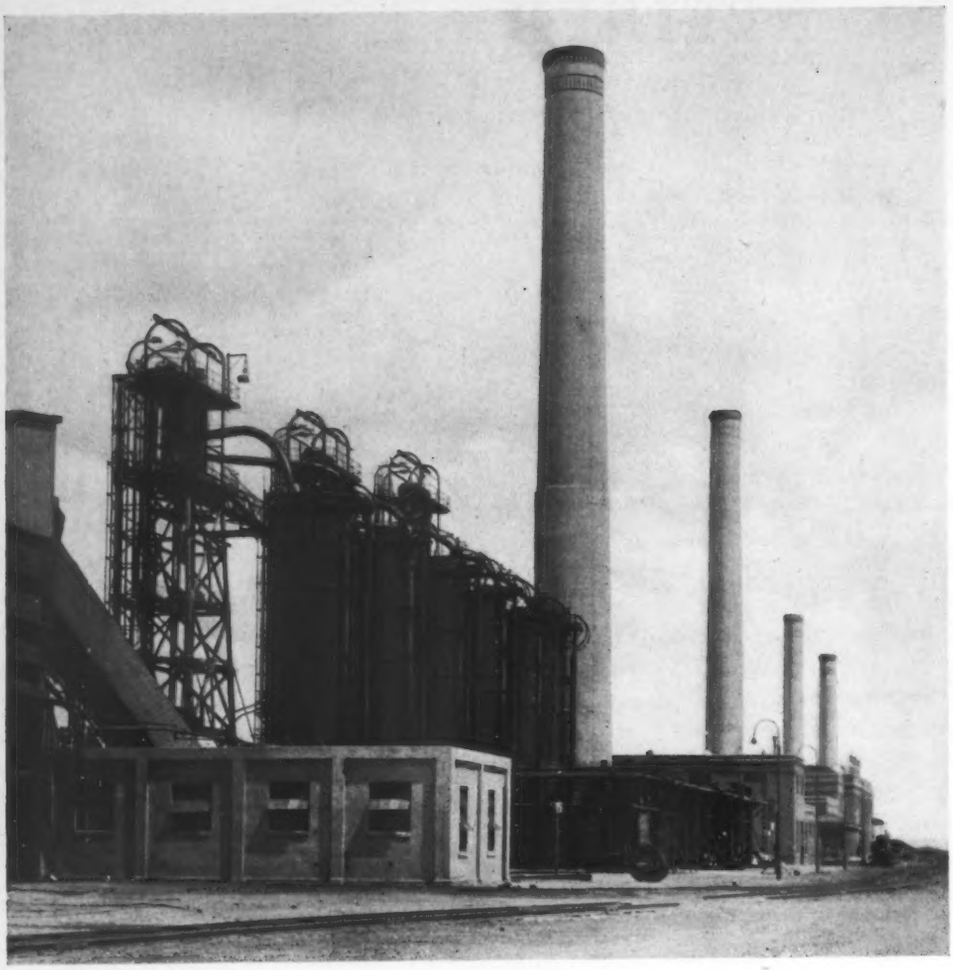
In that lies the hope, for men who realize what must be done are ready to attempt the task. That in substance is all the present offers, simply a willingness to rebuild slowly. An economic system that was not battered flat by the pounding of the past three years is accepted as one capable of repair.

Oil is but a part of this economic task. Its personnel sat without panic while the forecast of still further recession in gasoline consumption as forecast by economists at the meeting of the American Petroleum Institute last month. The men charged with the task of rebuilding took the attitude that the fortunes of oil would be saved.

Even without knowing what is demanded, men are still convinced that the repair can be made. They dare not forecast how long the job will last or to what heights they can build. Some think that gasoline consumption such as prevailed three years back will never return. Along with that they think that the industry can return to prosperous living without such use of its wares.

There is no assurance that the petroleum industry will not suffer still further disaster. But there is an assurance that whatever the added troubles, recovery still is possible.

It will be well for business as a whole when men cease to look upon 1929 as a goal to be regained and focus attention on a peak not so lofty but more secure.



Looking down the main street in the yard of Producers & Refiners Corporation, Parco, Wyoming.

Stabilizer and Absorber OPERATE ON Pressure From Still

J. C. ALBRIGHT

AFTER the 10 old type Dubbs cracking units were replaced with six new ones in 1928, Producers & Refiners Corporation at Parco, Wyoming, began to study the practicability of installing a plant through which the pressure distillate, from reduced bottoms after skimming Lost Soldier crude, could be processed to remove the butane contained in it, together with any other lighter or heavier hydrocarbons desired. When the unit and accessories were discussed with the plant engineers, a decision was made to utilize tanks, drums and towers salvaged from the plant when the change was made from the old type cracking units to the newer ones. Consequently, when the major units of the stabilization plant were erected, they consisted of parts almost entirely taken from dismantled equipment.

The fractionating tower was designed to remove as an overhead product, 15 per cent of the raw pressure distillate charge with a resultant bottom product, pressure distillate, with a vapor pressure of 3.5 pounds. A deep cut is made in order that acid treatment can be carried out at atmospheric pressure. Treating a product at that altitude with a higher vapor pressure results in a higher loss than accompanies the same material at points nearer sea-level.

Taking three old Dubbs dephlegmators as material for the tower, they were fastened together as follows: the upper two were welded together with the flanges at opposite positions. The lower one was flanged to the others, and a bottom was welded with a connection so that pressure distillate could be drawn off at that point.

Supporting feet or lugs were welded to the base in order that the tower could be placed upon four concrete pillars. A portion of a fourth dephlegmator was cut off at the flanged end and that part was flanged to the upper end of the tower and closed at the top with an orange peel weld so that the overhead vapor line could be attached at that point. Thirty-five trays were placed in the tower, 10 of which were to be utilized as stripping plates and the remaining 25 as fractionating trays.

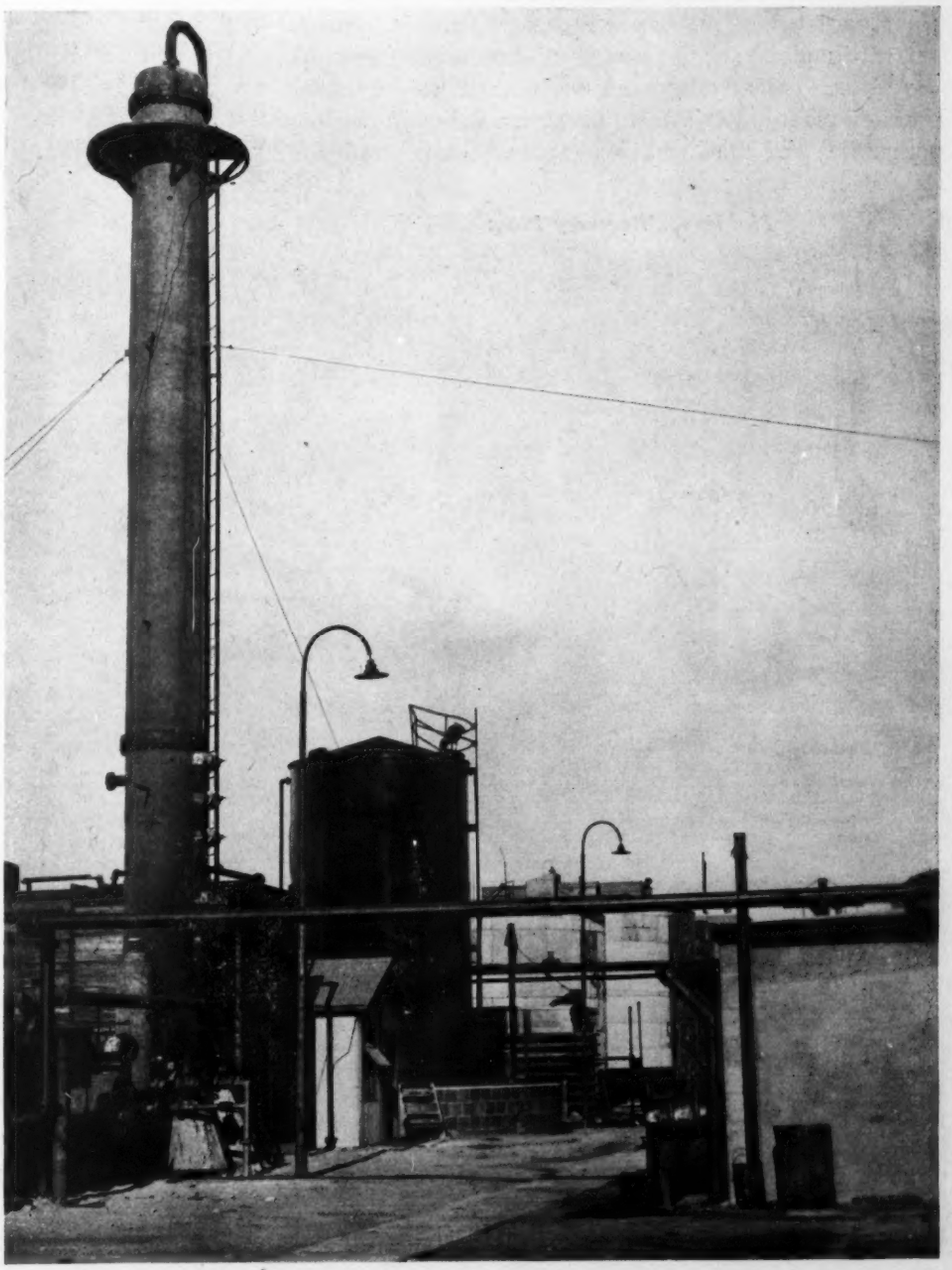
As the pressure distillate comes from the Dubbs units, it is passed from the accumulator drums to a common tank. This tank is a discarded Dubbs reaction chamber and sets in a horizontal position on concrete piers, with the heat exchangers and reboiler sections between it and the tower. Eighty pounds pressure is carried on the system, backing up against the stream from the condensers on the Dubbs units. No pumps are used on the pressure distillate stream as the pressure from the cracking units is sufficient to force the liquid through the surge drum to the other portions of the plant;—controlled in a constant volume from this drum by a liquid level controller.

Passing directly from the heat exchangers, the pressure distillate in process is introduced above the stripper plates in the tower. As it falls through the 10 stripper sections, it is drawn from the base to the reboiler, placed beside the tower and below the base. Temperature of 310° F. is maintained on the reboiler, and the liquid and vapors coming from it are introduced into a side stripper, or drum placed at the base of the tower. This drum is a short section of heavy casing with the upper end connected to the tower. A liquid level controller is placed on the side of this drum, which maintains a constant predetermined level in the tower as well as in the stripper drum.

Vapors coming from the pressure distillate at the introductory point in the tower under preheater temperature of 315°, and those from the side stripper, pass upward through the tower in the conventional manner. As 15 per cent of the raw pressure distillate charge is removed from the overhead through a six-inch vapor line, only as much as is necessary for reflux is condensed. The entire stream of vapor is passed through a bank of American Radiator Company sections and the liquid separated from the uncondensed vapors in an accumulator tank. A pump picks up this heavy overhead and passes it back to the top of the tower in sufficient quantity to maintain a top temperature of 225° F.

At the time of constructing the pressure distillate stabilizer, company engineers continued the process to that of conserving the light vapors removed as an overhead product from the column and those vapors and uncondensed gases coming from the run tanks at the skimming battery and those collected from the various tankage in the plant yard. Instead of venting the un-

Tower and side stripper of the Pressure Distillate Stabilization Plant



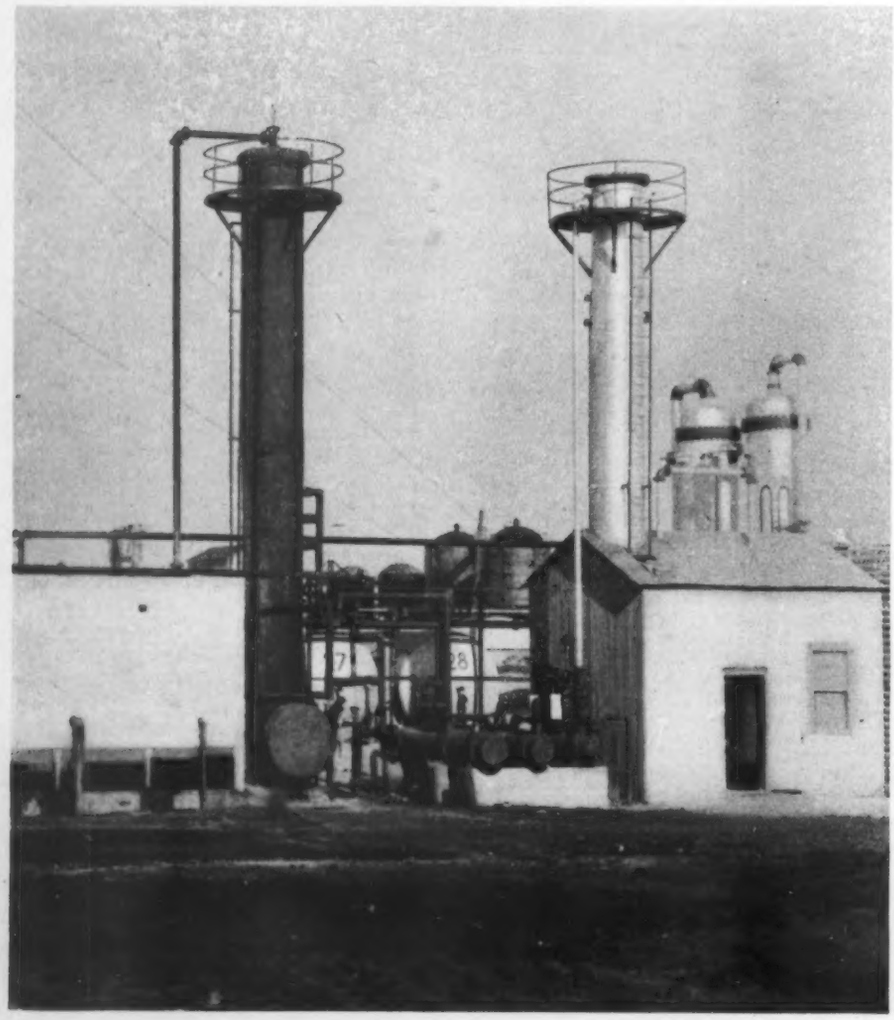
condensed overhead stream from the pressure distillate stabilizer into the common gathering system of the vapor recovery plant, a rather unusual application of delivery of these gases to the absorber at the recovery plant was placed in operation.

The uncondensed vapors from the stabilizer are carried through an unobstructed line directly to the absorber of the vapor recovery plant without being reduced or controlled by a back pressure valve or regulator. Under these conditions, the Dubbs units, the pressure distillate stabilizer and the absorber of the vapor recovery plant operate through the back pressure furnished by one valve on the residue line leading from the top of the absorber. By maintaining a predetermined pressure on the outlet of the absorber the pressures on the systems on the upstream side of the absorber always remain the same. If the absorber in the vapor recovery plant was situated near the pressure distillate stabilizer, this procedure would not be so unusual, but the pressure distillate stabilizer is situated in one end of the plant yard, while the vapor recovery plant is located several hundred yards from it at the opposite end of the plant. This arrangement of location prevents the pressure plant stillmen from observing the operation of both units, and the Dubbs operator who takes care of the pressure distillate system must depend on the vapor recovery plant operator for pressure control.

The other vapors and uncondensed gases are collected through a gathering system and boosted by a battery of Clark compressors, mingling with the pressure distillate overhead stream at the inlet of the absorber. Previous to being introduced into the absorber shell, the gases are cooled in separate sections, and come in contact with each other only at the entry of the column. Usual conditions are encountered in the absorber, with the absorbing medium stripping the vapors of their desirable content. All the overhead gases passing from the absorber are controlled through a common reducing and control valve, and passed to the plant fuel system.

As the rich oil is trapped from the absorber through the heat exchangers and preheaters, it is introduced to the steam still for stripping. The bottom of the still is carried at 320° F. and the top maintained at 240° F. Gasoline is refluxed over the still to maintain this temperature in controlling the end point. Leaving the still in the overhead vapor line, the product recovered from the mixture of tank, receiving house, and pressure distillate vapors are condensed and placed in a mixing tank where it is blended with the surplus gasoline condensed at the pressure distillate stabilizer. The gasoline condensed from the vapors from the pressure distillate stabilizer in the cooling coils at the recovery plant is also blended with the other products if it is color free and the other characteristics are of a nature that will permit blending without running through the still.

The Vapor Recovery Plant



An average of 400 barrels of finished gasoline is manufactured daily and passed through the final product fractionator with a vapor pressure of 14 pounds Reid. The final product fractionator is operated at 130 pounds column pressure, a bottom temperature of 250° F. while the top temperature is maintained at 140° F. by refluxing condensed overhead gasoline back over the column. The finished gasoline from the final product fractionator is blended with the products manufactured by Producers & Refiners Corporation in its gasoline plants in the field and the product coming from the skimming and cracking units. The vapor pressure is maintained at that low point because of the high altitude and low barometric pressure existing in the territory over which the products are sold.

Hot Oil Pumping Problems

. . . *Vacuum and High Pressure*

G. VANDENBERG, M.E.

LIFTING oil by means of the piston type pumps employs the weight of the column of atmospheric air to push the oil into the space that is evacuated by the displacement of the piston. In this evacuated cylinder there is a small absolute pressure caused by the vapor pressure of the oil, and the warmer the oil the higher is this vapor pressure. Naturally the difference between the atmospheric pressure and the vapor pressure of the oil is decreased with increases in the temperature of the oil.

Following the temperature, the vapor pressure finally becomes equal to the atmospheric pressure and the suction lift of the pump becomes theoretically "zero." Prior to reaching this state, however, the pump has ceased lifting the warm oil, or what is the same, the atmospheric pressure was insufficient to push the warm oil into the pump cylinder. This occurs because the vapor pressure is not the only force to be overcome, as there is the friction in the suction line, the weight of the suction valve and the force of the spring on top of the valve. Further, the total volume of the oil in the suction line had to be accelerated each time the piston started a new stroke. All this must be done by 14.7 pounds per square inch absolute pressure. Not included are such matters as the air that leaks in through the stuffing boxes, and add to the vapor pressure inside the pump. This explains why the hot oil can not be lifted simply through displacement of the piston. The principal reason for the failure is that by displacement of the piston the evacuated space is immediately filled with vapor of such a tension that 14.7 lbs./sq. in. abs. is insufficient to push the oil into the cylinder. This condition is shown in Figure 1. In case the hot oil must be drawn from a vacuum fractionator with about 28 inches vacuum, the situation becomes more complicated, as the absolute pressure is under such conditions two inches mercury or about one pound per square inch, instead of the 14.7 pounds atmospheric pressure.

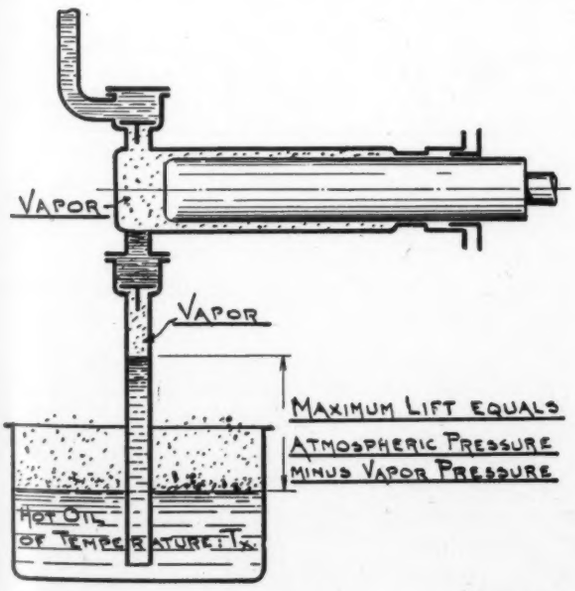


FIGURE 1

Showing vapor-bound hot oil pump.

In the powerhouse the practice is to extract the hot condensate from steam condensers through vertical lines into valveless pumps—in the manner as shown in Figure 2. In this arrangement we note (1) absence of pressure drop in the suction line, but a little pressure rise, instead; (2) no friction along suction valves as the pump is valveless. A pump of such type familiarily known to the writer is the Edwarts, which served mostly as a wet-air pump and extracted condensate as well. The device has no suction valves but the condensate-air mixture is admitted through slots in the wall. This is a widely used European type of installation. The arrangement is also so that the condensate flows toward the pump in sloping lines. The magnitude of the vacuum has no bearing upon its functioning. As long as leakage is avoided preventing outside air entering the pump, the hot condensate flows toward it.

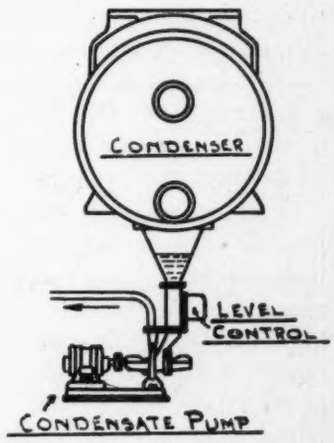


FIGURE 2

Typical arrangement for draining hot condensate from steam condenser.

Pumping hot oil, either from vacuum operated or pressure operated vessels is analogous to the extraction of hot condensate from steam condensers. Hot oil is

usually at such a temperature—according to the pressure that prevails in the corresponding vessels—that its physical status may be defined as being at or near its

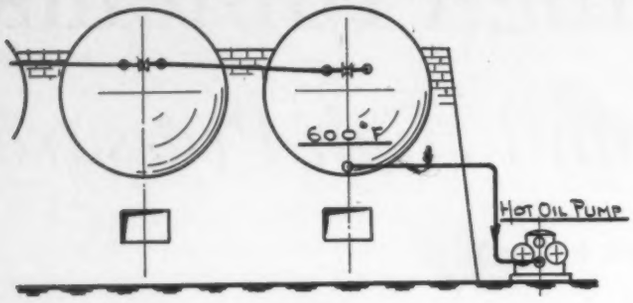


FIGURE 3

Hot oil pump drawing hot bottoms from crude still.

boiling point, no matter whether this pressure be one pound or 100 pounds per square inch absolute. (See Figure 3.) In the crude still, the fractionator, the rerun still, gasoline or reflux condenser, in the cracking still; it is always a distillate, cut or bottom, of a temperature at or a little below where ebulition may be expected. For this reason the designer should never allow the pressure on the suction side of the piston to become lower than the pressure in the vessel from which the oil is drawn to the pump.

It may be safely assumed that if the pressure in the evacuated cylinder is lower than in the accumulator or fractionator, wherever the hot oil is pumped from, the oil in the pockets and clearances of the pump will partially evaporate and the pump gets "gas-bound." Gas-binding occurs when pumping pressure distillate or gasoline at about 80° F. A suction lift of from four to six feet, meaning a lowering of pressure of about 1.5 to 2.5 pounds per square inch, will cause gas-binding.

It also may be assumed that all hot oils, during the process of manufacturing, contain several light fractions that if they were separated, would be in the vapor phase, according to their temperature. A slight decrease in pressure will cause partial evaporation of these fractions and the ensuing pressure stroke will only partially liquefy these new vapors. In certain installations the pump suddenly gets gas-bound, after having been in normal operation for several hours. This may happen as a result of incidental variation in gravity (or temperature) or as a result of sudden increase in suction resistance through corrosion or sediment.

There are different ways to overcome this. One way, and it is by far the most effective way, is to provide for so much static pressure at the intake side of the pump that it outweighs all possible resistances with a good margin. The static pressure may be twice as high as strictly necessary, as shown in Figure 4.

Another means is to arrange a booster in the intake line. Pumping with the aid of a booster is really dividing the pumping operation in stages, as for instance is done in high vacuum work or high pressure compression work. Pumping a vacuum down to 1/1,000,000 of an atmosphere absolute, happens usually in four to five stages; compressing air or gas to 1000 pounds per square inch requires three to four stages. The result is much better mechanical and volumetric efficiency than if done in a single stage. The pockets and clearances of the following smaller cylinders are smaller and this results in a better "suction-effect" (volumetric-effect) at the suction side of the piston.

Something similar may be arranged in high pressure, hot oil charging pumping machinery. On account of the vast circulation in cracking stills and incomplete separation, certain vapors and light fractions go along in the circulating oil and change to the vapor state as result of the alternating increase and decrease of pressure. High pressure fractionation due to the smaller fractionators, is less efficient than low pressure fractionation, hence the presence of unstable fractions. It is concluded that in these hot oil charging pumps, where the pressure in the cylinders changes back and forth from 100 to 1200 pounds per square inch, a following up of evaporation and condensation will happen in such a way that small portions of the lighter vapors remain vapor and become non-condensable. The pump then becomes gas-bound.

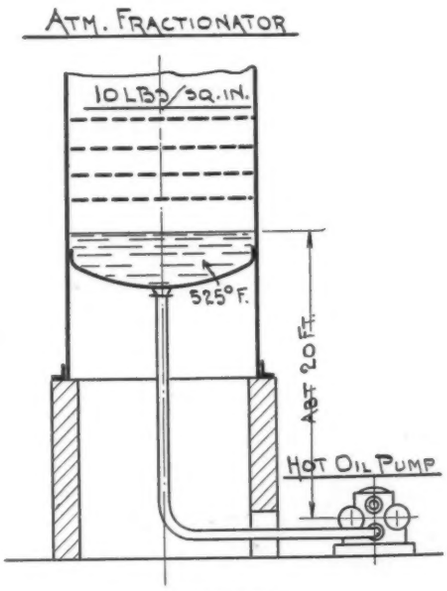


FIGURE 4

Typical arrangement showing satisfactory static head at intake side of hot oil pump.

Splitting this difference between intake and discharge pressure over two pumps is then a good solution. The booster pump boosts the pressure from 100 or 150 to about 600 or 650 pounds per square inch, while the other pump takes care of the remainder of the pressure. (See Figure 5.) The alternating of pressure between 150 and 600 pounds limits the possibility of evaporation and so does the alternating between 600 and 1200 pounds.

A third means of preventing gas-binding is to cool the pump cylinders or the plungers, which causes the oil to be cooled to a temperature far enough below its

previous boiling point, so that the oil can be pumped without failure. Figure 6 shows in a schematic way, the arrangement of such a water cooling system for plungers.

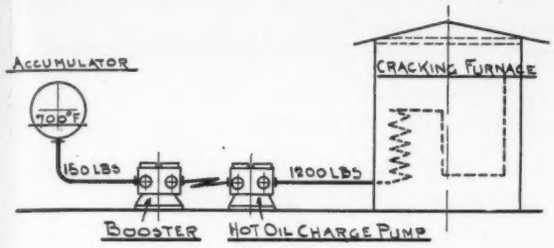


FIGURE 5
Arrangement of booster in high pressure hot oil charging line.

High pressure, multi-stage centrifugal pumps do not need this booster or cooling equipment, as a centrifugal pump can easily be arranged so that the small resistance in the intake line can be taken care of by a small static head and the oil may enter the first impeller with slightly more pressure than the pressure in the accumulator or fractionator, from where it just left. There is no altering in pressure as in piston pumps but a gradual increase. Multi-stage centrifugal pumps for hot oil charging purposes, have been successfully developed and operate satisfactorily. (See Figure 7.)

They are built of high class steel, heat treated and quenched to prevent distortion when operating under high temperatures and their rotating parts are equally of the highest grade alloy steels.

Extracting hot oil from a vacuum fractionator is a problem analogous to extracting condensate from a steam condenser. (See Figure 2.) The hot fluid must be brought by gravity only into the inside of the pump, thereby increasing in pressure, rather than decreasing. (See Figure 8.)

A large, practically frictionless intake line, a valveless pump and a small static suction head are the main requirements. Of course a common piston pump of the long stroke type will perform satisfactorily, as long as the design arranges for enough static head on the suction side. (See Figure 4). The long stroke pump is better suitable for this purpose than the short stroke pump, probably because the long stroke pump leaves more time for the slowly moving liquid to fill a portion of the evacuated cylinder than does the short stroke pump. In fact, when the long stroke pump is run with the same speed as the short stroke pump, it will "kick-off" just the same. This is all due to the fact that the faster a pump runs, the less time is left to accelerate the liquid into motion and into change of direction, the shorter the time to lift the suction valves and the larger the pressure difference necessary on both sides of the suction valves, to perform all this, while there is hardly any pressure available. There are several valveless pumps on the market, which theoretically spoken, all

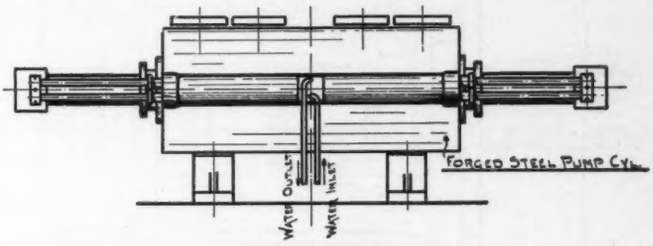


FIGURE 6
Pump-end of high pressure, hot oil charging pump with water cooled plungers.

would be fit for the job, if they were provided with stuffing boxes that would stay air tight for a reasonable length of time. Valveless pumps, such as centrifugal pumps, gear pumps, vane pumps, etc., are meant. Most all rotating pumps are valveless. Any rotating pump, built to produce about 30 pounds pressure, may be used as vacuum extraction pump as long as it measures up to the following requirements: it must have a stuffing box that practically prevents any air entering the pump;

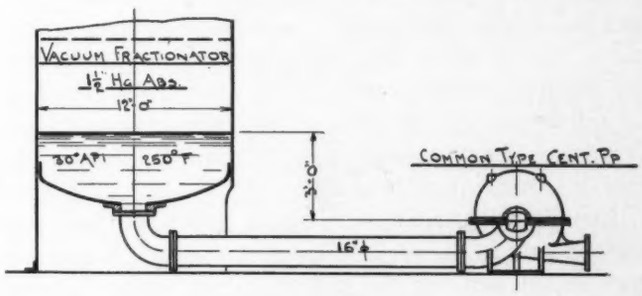


FIGURE 8
Showing centrifugal pump drawing hot circulating oil from vacuum fractionator.

the packing of this stuffing box must stand up long enough without being replaced; the whole pump must be of such sturdy design that it can stand a hard 24-hour service for at least a half year, without seeing the inside of a repair shop.

The operation of refining is a 24-hour business, during 360 days of the year and only the best quality of pump can stand, to a certain extent, the torture of hot corrosive oil. Often pumps are hopelessly worn out after a half year service.

Stuffing boxes of rotating pumps are causing more trouble than those of reciprocating pumps. The peripheral speed of the shaft of most rotating pumps is

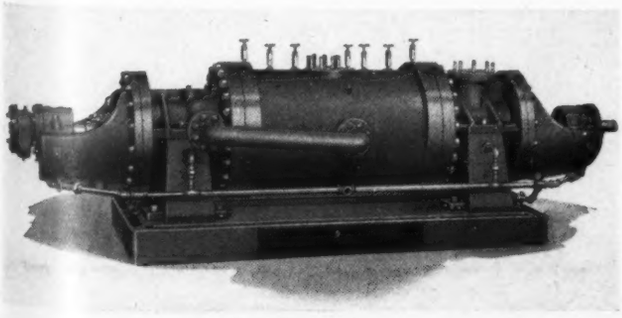


FIGURE 7
Hot oil multi-stage centrifugal pump.

much higher than the speed of piston rods. For instance, a 1½-inch shaft of a centrifugal pump of 1800 revolutions per minute has a peripheral speed of about 750 feet per minute. A piston pump has seldom more than 50 feet per minute piston speed. The packing of a stuffing box of a piston pump will follow and seal the rod if, on account of worn liners or slightly deflected rod, this rod moves out of center, as the eccentric movement is only a slow one. But the shaft of a centrifugal pump is more mobile and the elasticity characteristics of no one packing are such that the packing can follow the motions of the shaft that result from deflections and vibrations with a frequency of 30 per second. Consequently, the packing is beaten away, reamed or worn. Frequent tightening of the gland, sometimes several times a day and frequent repacking, every other day or so, is the result. A mechanic is often found around those places, repacking stuffing boxes. The stuffing box is the touchy spot in rotating pumps and holds lots of grief. Probably because the shafts are too flexible and the conventional type of stuffing box is not fit for high speeds and high temperatures, even if watercooling is applied. For steam turbines this problem has been solved long ago.

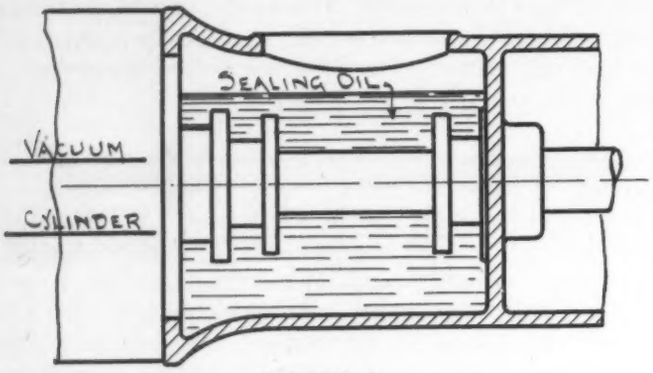


FIGURE 9

Showing sealing of piston rod of vacuum ammonia compressor of low temperature refrigeration plant.

Liquid sealing along the lantern ring works satisfactory as long as the packing is not worn out. A satisfactory liquid seal for the piston rod of ammonia compressors that operate under vacuum at the low pressure or intake side, (for -60°F. refrigeration of wax-free oil) has been observed lately and is shown in Figure 9.

The compressor had two sutffing boxes, one at the cylinder head and one at about six inches distance. The piston rod between the stuffing boxes and the boxes itself were entirely submerged in oil, thus sealing the stuffing box at the cylinder head. No air could enter the cylinder and build up pressure in the refrigerating system. Of course a little of the sealing oil will leak in, but that depends for a good deal upon the viscosity of the sealing oil. A similar seal can be arranged for centrifugal pumps that operate under vacuum.

Finally, there is a type of two-stage centrifugal pump that is specially adapted for vacuum pump-out work. The pumps are built so, that they do not have a stuffing box at the vacuum side of the pump and for this reason the pump is built in two stages, although the work could be done easily by one stage. Splitting the pump in two stages makes it possible to arrange the only necessary stuffing box at the end where the pressure inside the pump is greater than the atmospheric pressure. (See Figure 10).

The pumps are also built as upright pumps. Air leakage into the vacuum side of these pumps is impossible and they are considered more stable and more efficient than single-stage pumps for vacuum pump-out work.

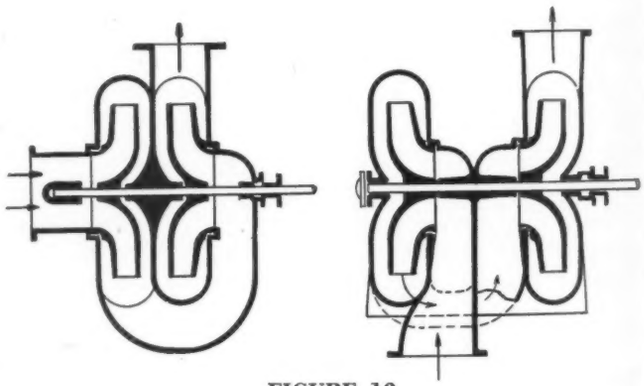


FIGURE 10

Typical two-stage centrifugal pump for high vacuum pump-out duty. Note absence of stuffing box on vacuum side.

The absence of air at the entrance of the pump stimulates a steady flow to the suction side. Furthermore, the first impeller can be designed so as to suit the high vacuum and the low entrance velocity conditions, while the second impeller can be designed to suit the pressure condition.

Misburg Plant

Adds to German Petroleum Refining Industry

THE newest and most modern petroleum refinery in Germany is that of Gewerkschaft Elwerath, at Misburg, Hanover, completed and put in operation in the spring of 1932 with a capacity rating variously reported at 560,000 to 700,000 barrels annually. This plant includes a complete 2600 barrel distillation unit, redistillation equipment, cracking facilities and auxiliaries necessary for modern operations.

The Gewerkschaft Elwerath combine consists of the Elwerath Company, the Wintershall Potash Company, the Prussian State, the Royal Dutch-Shell group and Standard Oil Company of New Jersey, each being financially interested in the refinery. The refinery was erected for the combine (lately mentioned in commerce reports as "Deurag" Deutsche Erdoel Raffineries, A.G.), by Arthur G. McKee & Company, Cleveland, Ohio. It is the first German installation to be equipped with Dubbs cracking units.

Some of the crude oil requirement is furnished by the Nienhagen oil field, (so named because of its proximity to the village of that name) located about 30 miles northeast of Hanover, province of Hanover. Elwerath is one of the larger operators in this field, in company with Deutsche Petroleum A.G. and Rautenkranz-Groetzinger-Ebag Company. With oil from this field the investigators, Egloff and Nelson of Universal Oil Products Company, were able to obtain 55 to 68 per cent gasoline with an octane number of 73 to 75. The results of this investigation contributed to the decision to operate the refinery as a cracking system. Production from this field in March, 1932, reach 55,957 barrels, with the salt dome not yet completely explored.

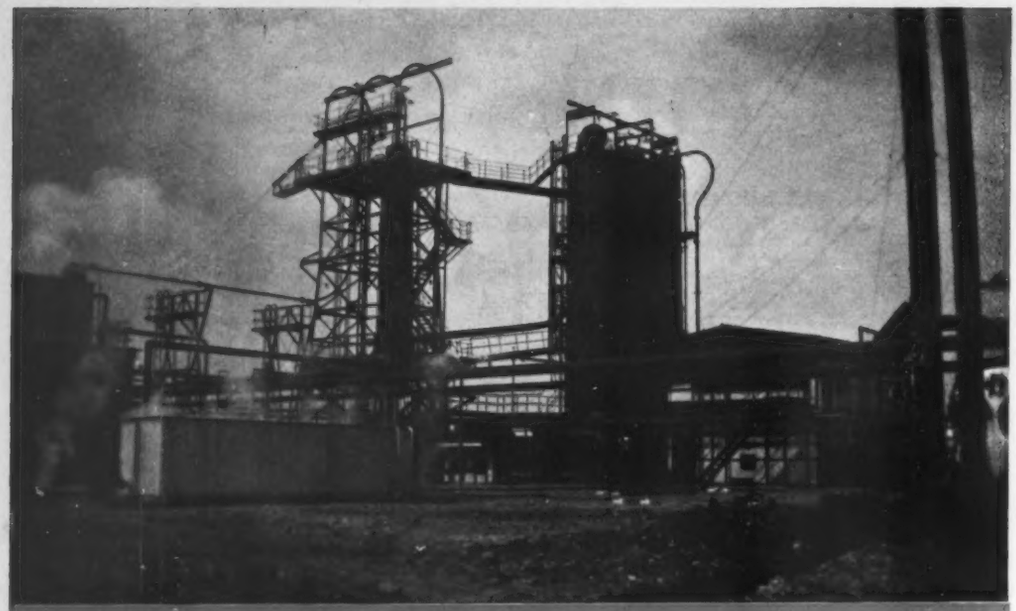
The new refinery, with its modern equipment, ranks well among the largest of the 35 plants in Germany. The German statistical office counts 35 refineries in the country, 10 of which are in Hanover Province, seven each in the Rhineland and in the Schleswig-Holstein-Hamburg-Bremen areas, six in Berlin-Brandenburg territory, three in Saxony, and one each in Westphalia and Bavaria.

The largest refining units in Germany are the straight asphalt works, namely, American owned 'Ebano-Asphalt A.G., of Harburg, with an annual capacity of 2,520,000 barrels; the Phenania-Ossag Mineraloel A.G. (Royal Dutch Shell) plant at Harburg, of 700,000 barrels annual capacity; and the Mineraloel u. Asphaltwerke Berlin-Groetzinger-Minuox, 700,000 barrel (annual) plant at Ostermoor.

Three other plants processing lubricants and rated at 700,000 barrels annually each, are the Rhenania-Ossag (Royal Dutch-Shell) plant at Monheim, the Royal Dutch-Shell plant at Hamburg, and Deutsche Vakuum Oil A.G. plant at Oslebshausen.

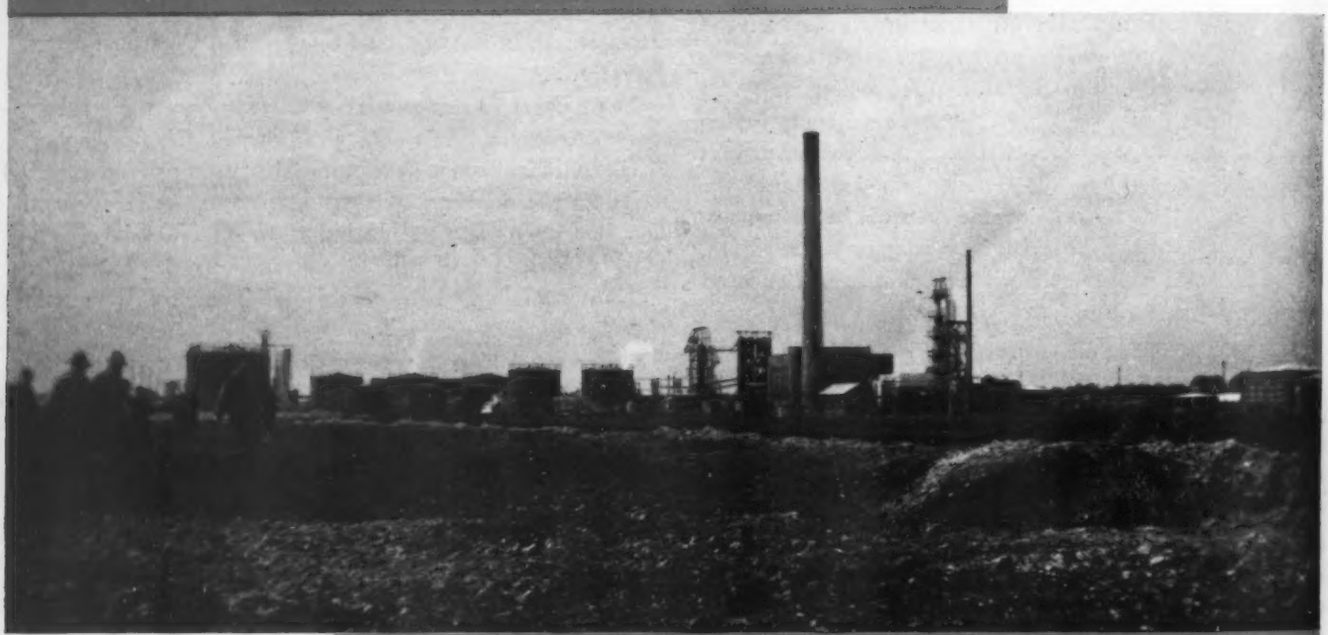
Two more plants are rated at 420,000 barrels annual. These are Deutsche Petroleum A.G. plant at Wilhelmsburg and the Royal Dutch-Shell plant specializing on solvent gasoline at Reisholz. Deutsche-Amerikanische Petroleum Ges. operates a 350,000 barrel annual capacity plant at Harburg, processing lubricants. All other German petroleum refineries are smaller, with capacities in some instances lower than 35,000 barrels annually.

In reporting on German refining it is well to include the synthetic plant of the Leunawerke at Merseburg (I.G. Farbenindustrie) which is hydrogenating lignite tar by the hydrogenation process, for the production of 100,000 tons of synthetic gasoline annually, and the birth place of the American hydrogenation developments.



Views of the

Misburg, Hanover, Germany

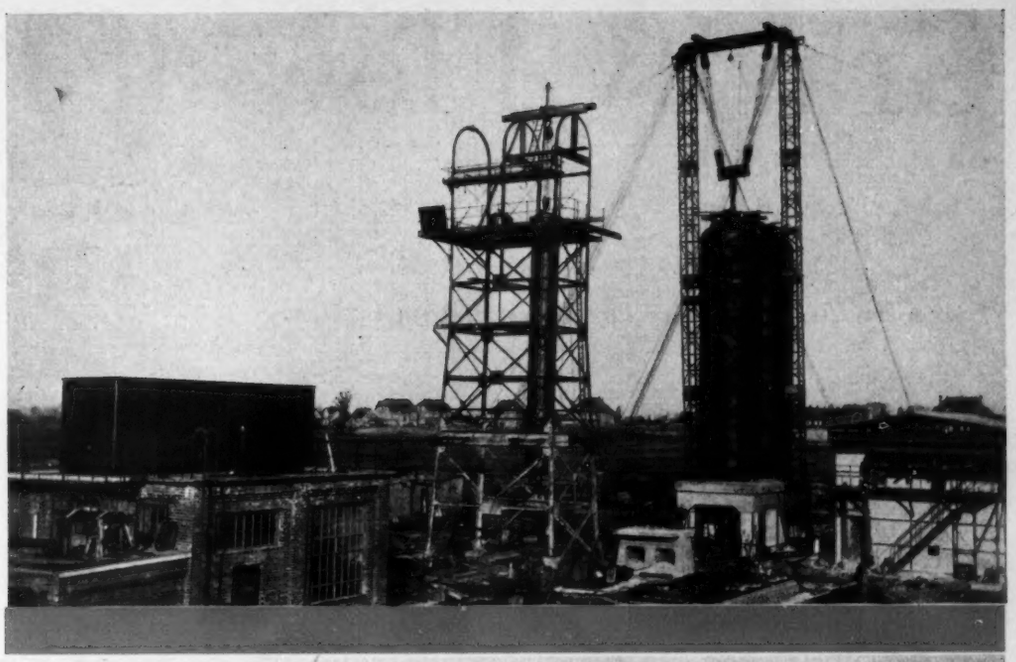


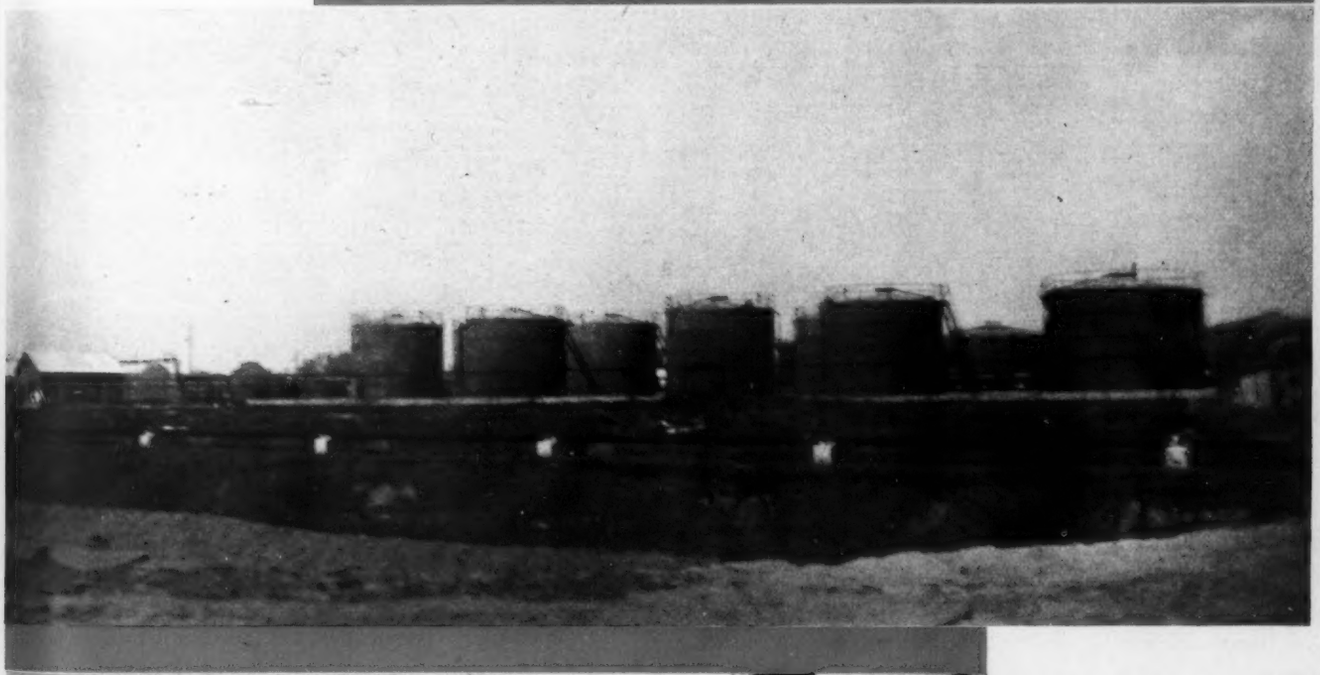
Top: This cracking unit, built by Arthur G. McKee Company, was placed in operation early in 1932.

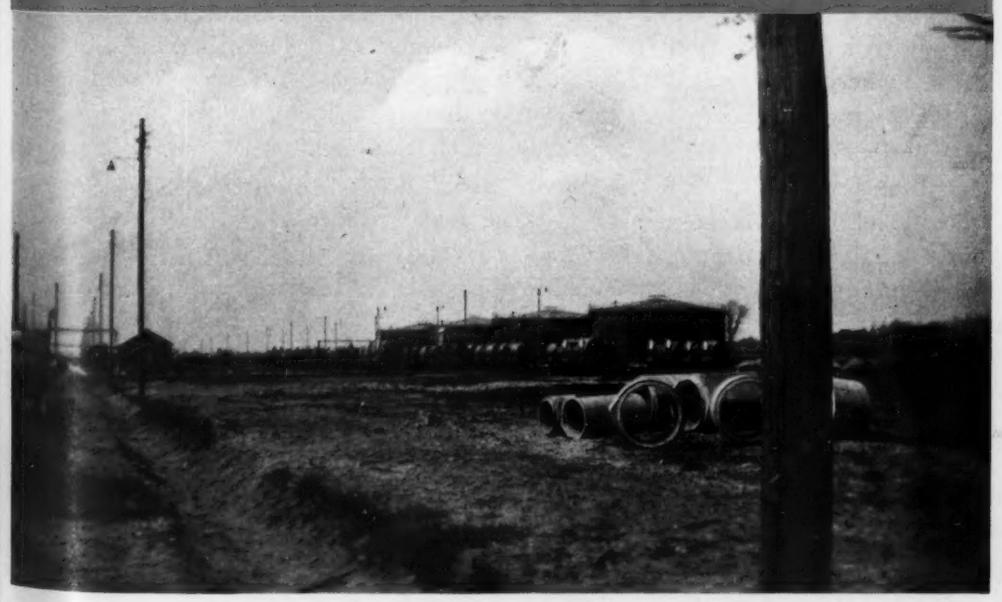
Center: General view of the plant.

Below: Another general view.

Gewerkschaft Elwerath Refinery







Top: Dubbs cracking unit under construction.

Center: Oil storage tanks.

Below: Loading racks.

Gravity Flow of Liquid in Pipes

R. T. BUSINGER

Formerly Engineer, Koppers Construction Company

IT is sometimes necessary to make calculations of the flow of liquids by gravity through a pipe line. Since this involves the properties of a circular segment the computations are usually more or less complicated. In particular, if it is required to find the depth of liquid in a given pipe where the slope of the line and the rate of flow are known, a trial and error method must be employed to find simultaneous values of the hydraulic radius and the cross-sectional area of flow which will satisfy the given conditions.

Thus, using the water flow formula of Williams and Hazen:

$$Q = Av = 1.32\ CAR^{.63} s^{.54} \qquad (1)$$

where Q = flow in cu. ft. per second,
A = cross-sectional area of flow, sq. ft.,
v = mean velocity, feet per second,
C = Williams and Hazen's constant,
R = hydraulic radius of the segment, feet,
s = hydraulic slope,* feet per foot,

simultaneous values of A and R must be found which will satisfy the relation $AR^{.63} = Q/1.32\ Cs^{.54} =$ a constant. This may be solved with the aid of a table of relations in circular segments but usually requires several attempts before A and R are determined and a further reference to the table is necessary if the depth is required. Since tables generally list only the properties up to half the area it is inconvenient to figure cases where the pipe is flowing more than half full.

In order to facilitate the solution of such problems the diagram Figure 1 has been prepared, giving relations of segments in a circle of unit diameter. Here h_1, A_1 and R_1 represent the height (or depth), the area, and the hydraulic radius for any segment when $d = 1$. To obtain the corresponding values for a similar segment (same ratio of height to diameter) in a circle of any diameter the following relations are used:

$$\left.\begin{aligned} h &= h_1 d \\ A &= A_1 d^2 \\ R &= R_1 d \end{aligned}\right\} \qquad (2)$$

*Sine of angle of inclination of surface.

In addition curves giving $A_1R_1^{.63}$ and $A_1R_1^{.5}$ have been plotted. The first of these will provide direct solutions of equation (1) which may be transformed as follows:

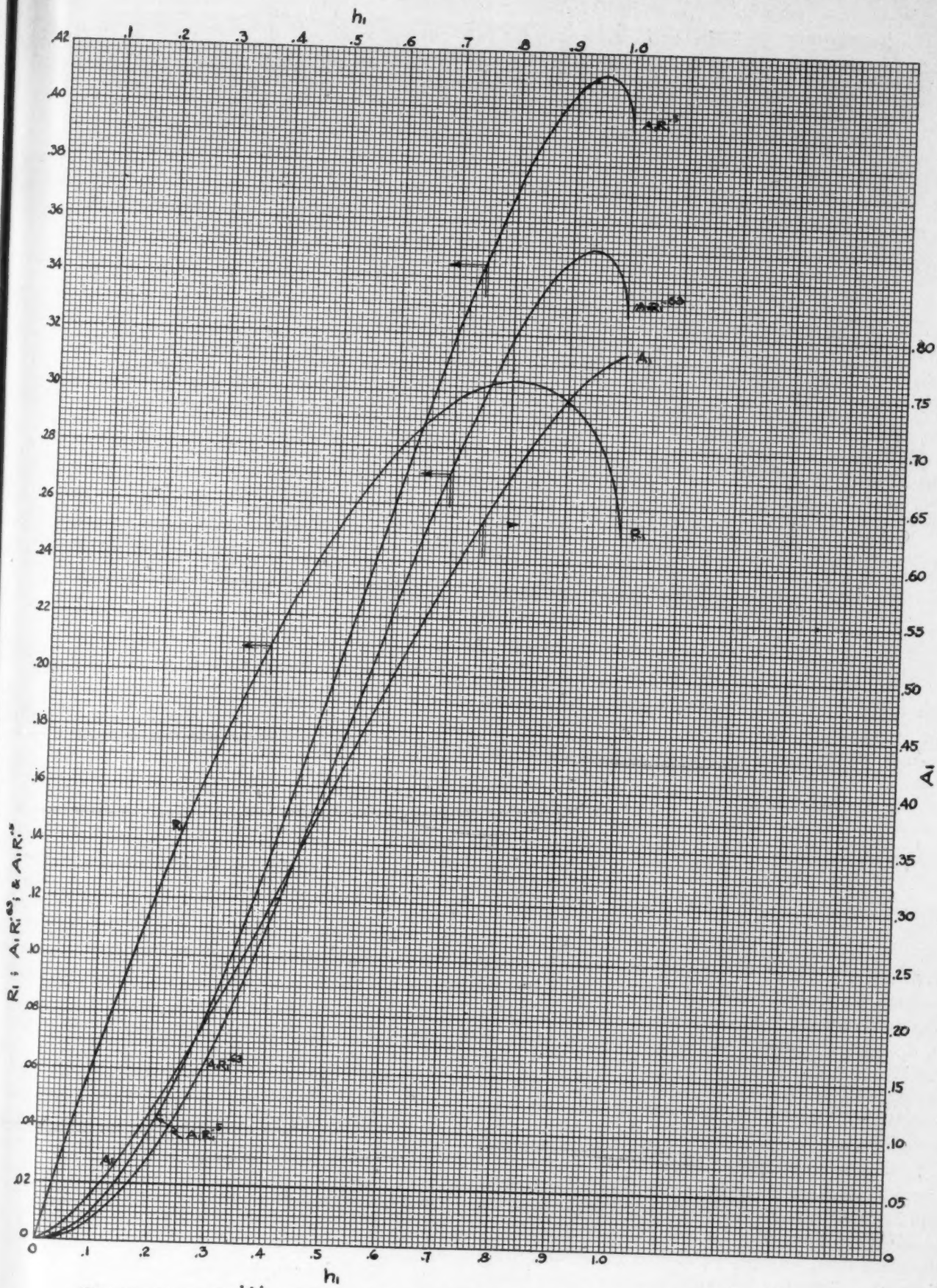
$$Q = A_1 d^2 v = 1.32\ C(A_1R_1^{.63})\ d^{2.63}\ s^{.54} \qquad (3)$$

Thus, with Q, d, and s known, the value of $A_1R_1^{.63}$ is calculated, and reference to Figure 1 will at once give h_1, A_1, and R_1 from which h, A, and R are found by equations (2). With d, h, and s known calculate $h_1 = h/d$, refer to the figure for $A_1R_1^{.63}$ and find Q by equation (3). The value of the constant C depends on the character and condition of the pipe surface and should be selected as directed in Williams and Hazen's tables.[1] In general $C = 130$ for "smooth" surfaces, 120 for ordinary cast iron and steel pipe in good condition, and 100 for rough surfaces or old pipe (17 year pipe). The chart, Figure 2, may be used in conjunction with Figure 1 to assist in solving equation (3). Here $Q/d^{2.63}$ or $A_1R_1^{.63}$ may be found with s and C given. In case the problem is outside the range of the chart the entering value may be multiplied or divided by any constant with a corresponding correction in the result. The chart may also be used for pipes under pressure, in which case $A_1R_1^{.63}$ will have the value .328 and s will represent the pressure loss in feet per foot. Values of $d^{2.63}$ and $s^{.54}$ may be found from Figure 3, or, for values of d and s not shown, with the log log slide rule. The flow is given in cubic feet per second by equation (3); for conversion to gallons per hour multiply by 26,900 which will make the numerical factor in the equation 35,500 instead of 1.32.

For those who wish to use Chezy's or Kutter's formula a curve giving values of $A_1R_1^{.5}$ has been included in Figure 1. However, since this formula involves a "constant" the value of which depends not only on the condition of the pipe surface but also on the slope and the hydraulic radius, the solutions will in some cases require a trial and error method.

$$Q = Av = CAR^{.5} s^{.5} = C(A_1R_1^{.5})\ d^{2.5}\ s^{.5} \qquad (4)$$

In this equation C = Chezy's constant which may be selected from various tables for different values of R and s, or Kutter's constant which may be found



RELATIONS IN CIRCULAR SEGMENTS FOR CIRCLE OF UNIT DIAMETER
h_1 = HEIGHT OF SEGMENT ; A_1 = AREA ; R_1 = HYDRAULIC RADIUS

FIGURE 1

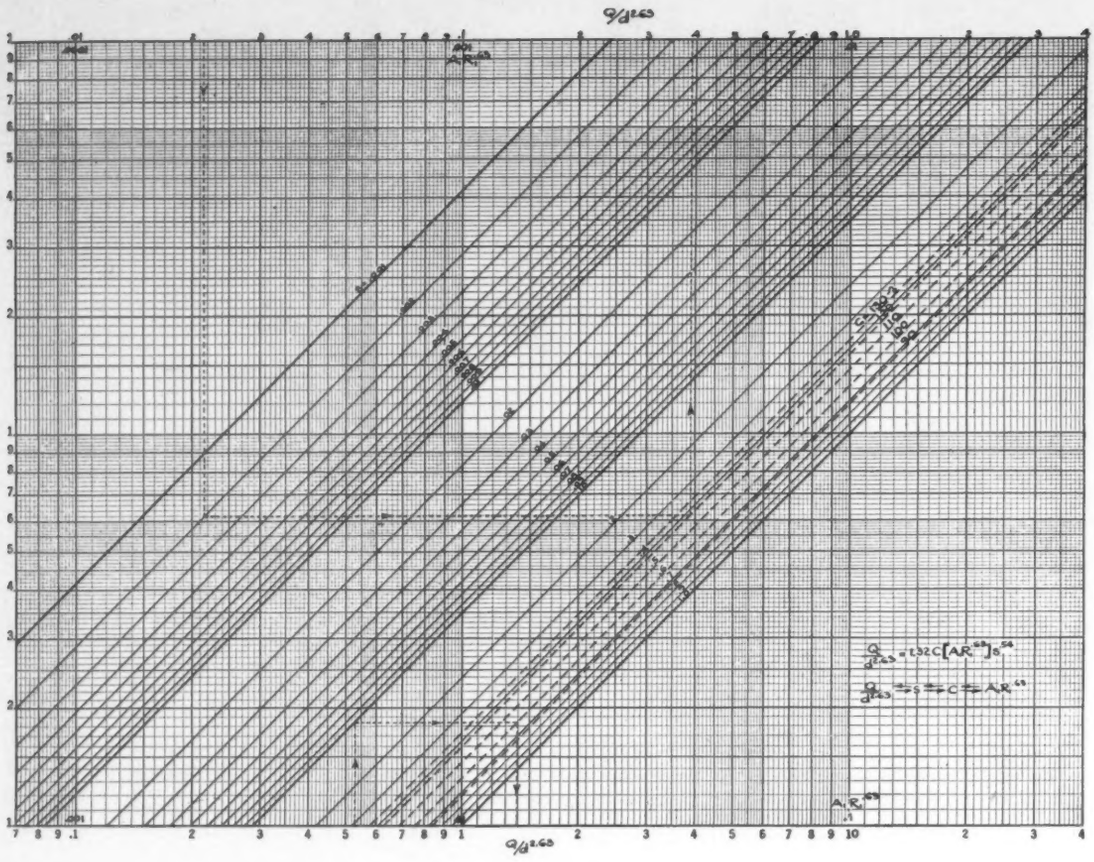


FIGURE 2

from tables or from the formula given by Kutter. The approximate formula for Kutter's C given by Durand[2] reduces the labor of computing this constant:

$$C = \frac{\frac{1.8}{n} + 45}{1 + \frac{45n}{R^{.5}}} \qquad (5)$$

Here n = coefficient of roughness which increases with the roughness of the surface, the values generally used ranging from .010 to .015. In cases where Q, d and s are known simultaneously values of A_1 and R_1 must be found which will satisfy (4) with C calculated as above or selected from a table, but the computation work necessary will be reduced by the use of Figure 1.

It will be noted from Figure 1 that for depths above $h_1 = .83$ with Williams and Hazen's equation and $h_1 = .86$ with Kutter's formula there will be two possible solutions, i. e., two depths which will give the same flow, between which it is impossible to distinguish. Since the hydraulic radius reaches a maximum value at $h_1 = .81$ the flow will also be maximum somewhere between this and full pipe depth. With Williams and Hazen's equation this point will be at $h_1 = .94$ where $A_1R_1^{.63}$ attains its maximum value. With Kutter's formula the maximum flow point does not coincide with the peak of the $A_1R_1^{.5}$ curve at $h_1 = .95$ but is located at $h_1 = .93$ approximately. This is due to the decrease in the constant as the hydraulic radius decreases.

To adapt the equations for water flow to apply to all liquids a correction factor involving the viscosity of the liquid must be employed. The determination of the factor is best approached through a consideration of the familiar Fanning's equation for turbulent flow of fluids, which applies to open or partially filled conduits as well as to pipes under pressure. It should be noted that the common water formulas apply to turbulent flow only.

Fanning's equation is as follows:

$$s = fv^2/2gR \qquad (6)$$

where f = friction factor, g = acceleration of gravity (32.2), and the other symbols are the same as in equation (1). The value of f has been found to depend on a function of the "dimensionless" quotient RvS/z, z expressing the viscosity of the fluid and S its density. The following relations will be given in terms of z = viscosity in centipoises (z = 1.0 for water at 68°F) and S = specific gravity, water = 1.0. The ratio z/S is the kinematic viscosity. The exact value and form of the "friction function" has been dealt with by many writers and it appears that it may be represented for practical purposes by $f = k(z/RvS)^n$, where k and n are constants, k changing

with the roughness of the pipe surface. This plots as a straight line on log log paper. Some authors[3] exhibit f as a curved or broken line but it is doubtful whether this is entirely justified by the experimental data and the use of the straight line equation permits its ready incorporation into flow formulas. When changed to the above units, the values of k and n for ordinary pipes given by Hohl[4] are k=.0055 and n = .178, and by Aisenstein[5], k = .0047, n = .17. From a plot of points calculated from Williams and Hazen's tables for C = 120 the writer arrived at the relation:

$$f = .0057(z/RvS)^{.16} \qquad (7)$$

Williams and Hazen's formula, though empirical, may be derived almost exactly by substituting this expression in equation (6). The above relations show that the loss in head varies directly as a fractional power of the kinematic viscosity. Taking n = .16, equation (1) then becomes, since s varies as $(z/S)^{.16}$:

$$Q = Av = 1.32\ CAR^{.63}\ s^{.54}\ (S/z)^{.087} \qquad (8)$$

[1]Hydraulic Tables, Williams and Hazen. Wiley, 1914.
[2]Hydraulics of Pipe Lines, W. F. Durand. Van Nostrand, 1921.
[3]Principles of Chemical Engineering, Walker, Lewis, and McAdams. McGraw-Hill, 1927. Also McAdams in Journal A. S. M. E., Oct. 1926.
[4]Flow of Gas, Refiner and Nat. Gas. Mfr., Aug. 1932.
[5]Trans. A. S. M. E., 1928. HYD 50-2 and 50-7.

For water z/S = 1.0 at ordinary temperatures and the correction factor becomes 1.0 thus reducing (8) to the original form (1). Kutter's formula, corrected for viscosity, becomes:

$$Q = Av = CAR^{.5}\ s^{.5}\ (S/z)^{.08} \qquad (9)$$

The factor $(S/z)^{.087}$ may be read from Figure 3 for values of z/S from .1 to 100, in which range $(S/z)^{.08}$ differs but little.

The above equations will hold for turbulent flow, that is, above the critical region where the flow changes from streamline to turbulent as the velocity increases. This region extends from about RvS/z = .002 to .007, in which interval the exact character of the flow will be uncertain. Below this the flow is streamline, with f = .000043 (z/RvS), and calculations must be based on Poiseuille's streamline flow equation. However, the flow will be turbulent under conditions ordinarily met with in practice and will permit of calculation by the above methods, which will also apply to pipes running under pressure. In cases of very viscous liquids or flat slopes a check of the value of the factor RvS/z should be made to determine the character of the flow.

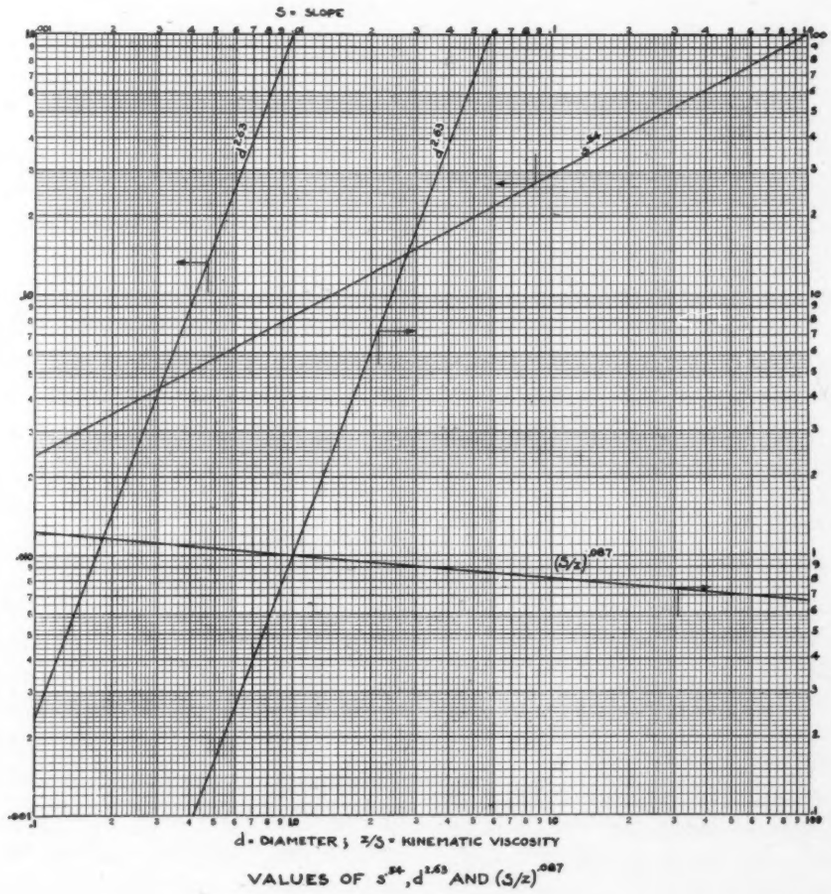


FIGURE 3

Role of Sulphuric Acid *in the* Treatment of Pressure Distillate

A. W. TRUSTY

Louisiana Oil Refining Corporation

ALTHOUGH various treating methods have been put into commercial operation in the last 10 years, the sulphuric acid method of treating petroleum naphtha continues to be the most widely used. This method has several disadvantages, but it has the advantage of practically all of the other treating methods. The advantages and disadvantages of treating cracked distillate with sulphuric acid can be listed as follows:

ADVANTAGES

1. Good color can be obtained with almost any type of cracked distillate.
2. The gum can be reduced to any practical specification.
3. The sulphur content can be reduced considerably.
4. The odor can be improved remarkably.
5. The stability to sunlight is markedly increased.

DISADVANTAGES

1. A treating loss is incurred varying with the amount of acid used.
2. A loss in knock rating is incurred depending on amount of acid used and nature of distillate treated.
3. Acid formation is caused on rerunning acid treated distillate. This acid formation results in corrosion to distilling equipment and loss in color.

SULPHURIC ACID

Sulphuric acid owes its value as a treating agent to the fact that it is a strong oxidizing agent. The formula, H_2SO_4, can be written,

$$\begin{matrix} OH- \\ \quad S{=}O_2 \\ OH- \end{matrix}$$

to show how the oxygen is made available.

Sulphuric acid is an oily liquid, colorless when pure, though often brown from the presence of charred organic matter. 66 Be' acid has a specific gravity of 1.835. It boils at 640°F.

In the manufacture of sulphuric acid, sulphur is burned to form sulphur dioxide (SO_2). The sulphur dioxide is passed over a catalyst to convert it to sulphur trioxide (SO_3). The sulphur trioxide is contacted with strong sulphuric acid where the sulphur trioxide reacts with the water present to form sulphuric acid. The strong acid is diluted with water to the desired concentration.

Degrees Baume	Specific Gravity	Per Cent Sulphuric Acid	Freezing Point
60	1.7059	77.67	+12.6°F.
64	1.7901	85.66	46.4°F.
66	1.8354	93.19	—29.0°F.
	1.8437	98.00	37.4°F.
	1.8391	100.00	50.0°F.

ACTION OF ACID ON THE HYDROCARBONS

The paraffins and napthenes, when in the pure state, are very resistant to the action of sulphuric acid, and, at the temperatures at which refining usually takes place are neither chemically acted upon nor dissolved by commercial sulphuric acid. The case is, however, different when these hydrocarbons are in the presence of such substances as are attacked or dissolved by sulphuric acid. Whether under these circumstances paraffins and naphthenes also undergo chemical changes has not yet been investigated, but it has been proven that they may be dissolved by sulphuric acid under these conditions in considerable quantities.

The aromatic compounds yield small amounts of sulphonic acids when treated with sulphuric acid. A typical reaction is

$$C_6H_6 + H_2SO_4 = C_6H_5SO_2OH + H_2O.$$

When these sulphonic acids react with steam during the rerunning operation, the aromatic hydrocarbon and sulphuric acid is formed again:

$$C_6H_5SO_2CH + H_2O + C_6H_6 + H_2SO_4.$$

In the presence of olefines and similar unsaturated hydrocarbons aromatic hydrocarbons may enter into condensation reactions under the action of sulphuric acid. Benzene and hexylene, for instance, condense in the presence of sulphuric acid as follows:

$$C_6H_6 + CH_3\,(CH_2)_3CH{:}CH_2 = C_6H_5CH \begin{matrix} -CH_3 \\ -C_4H_9 \end{matrix}$$

The group of hydrocarbons most affected by acid

treatment are the olefins or unsaturated compounds. Sulphuric acid absorbs some of the olefins and polymerizes others. Leslie (Motor Fuels) states that the mono-olefins are not polymerized to tars, but that these tars formed during acid treatment are caused by polymerization of di-olefins. The polymers formed from the mono-olefins are straight-chain compounds with one double bond. They are not of cyclic structure. Their reactivity with sulphuric acid is less than that of the olefin from which they were formed. They are soluble in the distillate and do not enter the sludge. The presence of these compounds causes the decrease in gravity and the broadening of the distillation range caused by acid treatment of distillates.

Due to the reactivity of the di-olefins, they are selectively removed by acid treatment. The gum, bad odor and yellow color of a cracked gasoline are attributed to the presence of di-olefins. The tendency of the di-olefins to polymerize increases with increase in molecular weight.

Olefins react with acid to form mono-alkyl esters:

$$C_5H_{10} + H_2SO_4 = C_5H_{12}SO_4$$

These esters are soluble in water and are removed by the water wash or caustic wash.

Dialkyl esters also are formed from action of the mono-esters and other olefins:

$$C_5H_{12}SO_4 + C_5H_{10} = C_{10}H_{22}SO_4.$$

These esters are soluble in the oil and are not removed by the water wash or caustic neutralization. During the rerunning operation these di-alky esters decompose to form tarry substances and sulphur dioxide. The corrosion often encountered in rerun equipment is due to the formation of sulphurous and sulphuric acid by combination of the water (from the steam) and the sulphur dioxide. Alcohols also are formed during the acid treatment. Naphthenic acids, and nitrogen compounds are effectively removed by sulphuric acid treatment.

ACTION OF ACID

The sulphur compounds present in petroleum naphthas may be grouped as follows:

Group	Formula
Hydrogen sulphide	H_2S
Free sulphur	S
Mercaptans	R-SH
Disulphides	R_2S_2
Sulphides	R_2S
Thiophene	C_4H_4S

Hydrogen sulphide is converted into free sulphur by sulphuric acid:

$$H_2S + H_2SO_4 = S + SO_2 + 2H_2O.$$

Any naphtha therefore should be washed with caustic soda or some other alkali to remove all hydrogen sulphide before the naphtha is contacted with acid.

Free sulphur is unaffected by sulphuric acid treatment. However, the percentage of free sulphur is very low (.005% to .02%) in most naphthas. The greatest source of free sulphur is from oxidation of hydrogen sulphide in the oil during the interval between the condenser box and the treating plant:

$$2H_2S + O_2 = S + 2H_2O.$$

By treating the naphtha either in the vapor line to the condenser box or in the line to the rundown tanks with caustic soda or other alkali, the formation of free sulphur is thus prevented.

The mercaptans are oxidized to the disulphides—

$$2R\text{-}SH + H_2SO_4 = R\text{-}S\text{-}SR + SO_2 + H_2O.$$

The only sulphur compounds that make a naphtha sour to doctor solution are hydrogen sulphide and the mercaptans. According to the reactions written above, an acid treated naphtha should be doctor sweet. This deduction is true in some cases where the naphtha was only slightly sour before acid treatment or where a large amount of acid was used. However, in most cases of commercial treating the naphtha is still sour to doctor after acid treatment, but the amount of sourness is considerably less than before acid treatment.

The disulphides and the sulphides are removed both by mechanical solution in the acid and by oxidation to disulphoxides and sulphoxides respectively. These sulphoxides are soluble in water and are removed with the caustic wash following acid treatment.

The thiophenes are the most stable of sulphur compounds. They are converted to sulphonic acids by the action of sulphuric acid:

$$C_4H_4S + H_2SO_4 = C_4H_3S.SO_2.OH + H_2O.$$

These sulphonic acids are removed from the oil by either a water wash or alkali wash.

Table 1 shows the effect of acid on distillate before and after rerunning.

TABLE 1

	Untreated Cracked Distillate	Acid Treated Cracked Distillate	Rerun Overhead from acid trt'd Cracked Distillate	Bottoms	Loss
Per cent	100	98	88	8.2	2.0
Gravity	54.5	54.0	55.8	32.2	
I. B. P.	103	106	110	410	
10% at	174	176	174	421	
20	210	214	210	424	
30	239	244	238	426	
40	270	273	265	429	
50	295	296	291	433	
60	321	322	312	439	
70	345	347	336	451	
80	366	370	358	480	
90	389	392	380	542	
95	406	410	396	628	
End Point	428	454	406	640	
Recovery	98	98	97.5	98	
Color	Yellow	Orange	25+	Dark	
Carbon Residue	....	....	....	0.50%	
Corrosion	Positive	Negative	Negative	....	
Doctor	Positive	Negative	Positive		
Copper dish gum	350	..	6		
Sulphur	0.15	0.12	0.06%		
Potential gum by 4 hr. oxygen test	419	..	20		

(*Continued on page* 610)

Role of Oxygen . . . *in* CONVERSION OF Hydrocarbons

I. N. BEALL
Chemical Engineer

THIS constitutes the fourth and last article of a series by I. N. Beall dealing with oxidation, oil-gas conversion and other processes of synthesis. In this work the author discusses craking and oxidation, heat transfer in the vapor phase, contacting and mixing for reaction, conversion, the choice of hydrocarbons for oxidation, and the vapor phase under pressure. The primary objectives of oil-gas conversion processes are to lower the cost of raw material through the use of natural or other cheap hydrocarbon gas, to increase yields by application of high pressures and to improve quality of finished products by the use of vapor phase processing.

OXYGEN is one of the most reactive substances with hydrocarbons. Crude oil and natural gas, as they occur in the earth, have been sealed off from contact with free oxygen for ages, which accounts for their unoxidized state when released by drilling. Oxygen is such a common and plentiful element that its importance as a chemical raw material has had a tendency to be disregarded in comparison with more expensive reagents such as, for example, chlorine.

Natural gas, too, is an abundant product and its apparent commercial possibilities as a chemical raw material have been until recently largely unrealized. Nevertheless, it is in the justifiable realm of prophecy that the not too distant future will find important commercial developments based upon reactions which take between oxygen and the natural hydrocarbons. Natural gas consists essentially of hydrocarbons of the paraffin series among which the lighter gaseous members such as methane, ethane, propane, isobutane and butane predominate. It is needless to emphasize that enormous quantities of these raw materials are available at low cost. A logical outlet is for use as domestic and industrial fuel in the natural state. The present indications are that its use as such will be extended. Aside from the use of natural gas as fuel, the other outlet at all proportionate to the supply would be as motor fuel or liquid fuel, since the demand for solvents and other possible organic derivatives is somewhat limited. There are also possibilities for the development of resins, plastics and protective coatings by the chemical processing of natural gas, as there is an increasing demand for these materials.

CRACKING AND OXIDATION

The major portion of research on the processing of natural gas, if the current literature is a criterion, falls principally into two classifications, namely (1) oxidation and (2) cracking.

Cracking implies the fragmentation of large molecules into small molecules. The smallest paraffin hydrocarbon molecule is methane and as it contains only one carbon atom it cannot shatter into other than hydrogen and carbon or hydrogen and some unstable hydrocarbon radicle of momentary existence such as CH^2. Any formation of higher hydrocarbons from the heat treatment of methane must then be the result of secondary reactions in which carbon and hydrogen are reunited into new and higher forms or else result from the combination of the radicles with themselves or with carbon or hydrogen or some combination of all three. In the absence of some added substance with which hydrogen will combine the proportions of hydrogen to carbon must remain the same as that of the methane molecule. In accordance with the theory of mobile equilibrium for each temperature and pressure above the unstable point of methane, the proportions and characteristics of the mixture will change to correspond to conditions imposed. The law of mass action works against the formation of higher hydrocarbons from lower saturated hydrocarbons for the reason that to go from the lower to the higher necessitates an excess of hydrogen in the system. Nevertheless, molecular heat stability and the law of probability play their part in such a system, and the cracking of low molecular weight hydrocarbons at high temperature has resulted in the formation of small amounts of liquid hydrocarbons, mostly of the heat stable benzene series.

The results to be anticipated are necessarily very limited, heat input is high and the high temperatures used are difficult to control and hard on metal tubes. The admixture of oxygen with the hydrocarbon gases undergoing heat treatment entirely changes the condi-

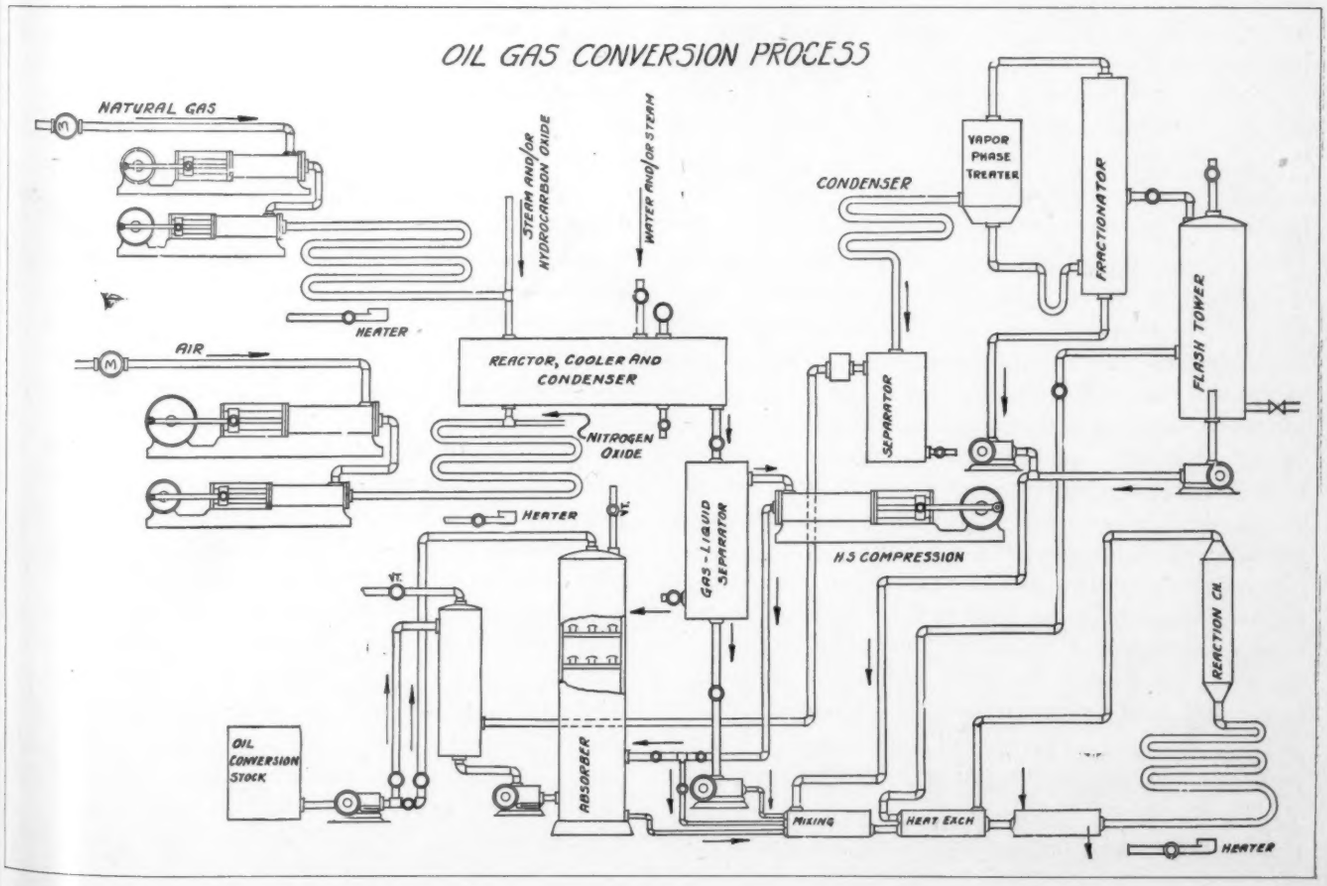
tions of equilibrium and lowers the temperatures at which chemical change occurs. Part of the hydrogen combines with oxygen and is removed as water, another portion of the oxygen may combine to form compounds of carbon, hydrogen and oxygen and also the oxides of carbon. All of these oxidation actions are exothermic and a temperature rise results because of the internal release of heat. This internal release of heat has the practical advantage of perfect conditions of heat exchange with the unreacted components of the system and it is thus evident that if there be sufficient oxidadation the temperatures will rise to where cracking of some of the original hydrocarbons will result as well as the cracking of those products of reactions, both the oxygen containing and non-oxygen containing. In short, the addition of oxygen has created a condition wherein the possibilities of synthesis, rearrangement and decomposition are greatly extended over that of straight cracking of the natural gas without such admixture.

Then again the addition of oxygen has caused a greater response of the system to pressure variation. It is no longer a question of getting reaction but the problem is to control it to get the results desired. The course and degree of the reaction is influenced by temperature, pressure, catalysts, time and proportion, and nature of the hydrocarbons present in the mixture. One therefore deals with a system that may be subjected to many variations which has its advantages and disadvantages. In so far as the manufacturer of a maximum of liquid hydrocarbons is concerned with a minimum of oxides of carbon and water, low temperatures and high pressures are favored with a short period of contact between the hydrocarbon and the oxygen. An excess of hydrocarbon over the stoichometric proportions as calculated is also to be desired from the standpoint of temperature control.

HEAT TRANSFER IN THE VAPOR PHASE

Inasmuch as any extensive oxidation of the hydrocarbons results in the evolution of large amounts of heat, efficient and rapid means for the dissipation of this heat must be provided in order that the temperature range suited to the reaction may be maintained. Such systems under high pressure have the advantage of better heat transfer per unit weight but the temperature will rise more rapidly and to a higher point unless rapid means of heat transfer are provided. The reacting gases may be cooled by expansion but to do so loses some of the benefits due to the effect of the pressure. Where the synthesis and polymerization of the primary products of gaseous hydrocarbon oxidation into compounds of higher molecular weight is the objective, the pressure should be maintained not only during the stages of initial reaction but also through the final stages.

Metal tubes of small diameter have the advantage over tubes of large diameter in that a greater surface and thinner metal may be used, both of which contribute to better heat transfer conditions between the gas and the cooling medium. In passing through the tubes at high velocity there is a considerable pressure drop



and some cooling by the consequent expansion of gases. Preferably the cooling medium should be a liquid of high specific heat and high latent heat and cooling effected by vaporization. The coefficient of heat transfer is high for a vaporizing liquid from a metal surface. Water, because of its high specific heat and high latent heat, makes an ideal cooling medium when vaporizing from a metal surface. Pressure control will also make steam serve as a thermostat up to its critical point.

The restricted oxidation of a hydrocarbon of natural gas into a pure partially oxidized compound is difficult and requires extremely close temperature and time control. The effect of a rapid temperature rise may be somewhat offset by an increase in the free space velocity. That is to say that to prevent the oxidation of the hydrocarbon from proceeding too far, the time within the reaction zone may be shortened or the temperature within the reaction zone may be lowered.

CONTACTING AND MIXING FOR REACTION

When natural gas hydrocarbons are admixed with air or oxygen and then subjected to elevated pressures and temperatures for the production of oxygen containing compounds of carbon and hydrogen by passing through externally heated tubes or vessels, the metal or solid wall of the passageways must of necessity be of higher temperature than the potentially reactant or reacting mixture in order that heat from the exterior may cause the temperature of the interior gases to rise to that of ignition.

Heating may be rapid or slow. Rapid heating requires a large temperature difference between the exterior and the interior of the reaction tubes. Slow heating inversely means a low temperature difference, but a difference nevertheless. At any time in the passage of the admixed gases (oxygen and hydrocarbon) through the heating zone, only a comparatively small amount is in direct immediate contact with the walls. Due to the higher temperature at the walls and the possible catalytic effects, the adhering gas film reacts. But it is not likely that the reaction stops in the film much short of the final stage of oxidation which is an oxide of carbon and water. Increasing or decreasing the rate of heating, as might be anticipated, does change the course of reaction in that it affects the time of contact of the tube with the walls, but at the same time the necessary higher temperature of the walls has a counteracting effect in so far as the primary partial oxidation products of hydrocarbons are concerned. Rapid heating and high velocity of the mixture tends to increase the yield of partially oxidized hydrocarbons under given conditions otherwise favorable for their production. If the chain mechanism for such oxidation is accepted, it is credible that increased turbulence caused by high velocity may have its effect on breaking up the "chains" and thus retarding the oxidation which has been initiated in the surface films.

Where the oxidizing gas and the hydrocarbon gases are heated and/or treated separately and then contacted for reaction the difficulties inherent to heating mixtures of the same are avoided. Reaction is then initiated on contact and the temperature is highest within the body of the gases as the heat transfer is outward in contrast to inward as when mixtures are externally heated through containing walls. The conditions for a homogeneous reaction are then satisfied, provided that the temperature, pressure, reaction promotion agents and admixture are correct. It then becomes a matter of varying the temperature, the pressure, the time, the amount of promotion agent or the proportions of the admixture, in order to attain the desired ends as circumscribed by the limits of possible reactions between oxygen and hydrocarbon.

One advantage of having the reaction zone separate from and subsequent to the heating zone is in the control. It is difficult to control the temperature within a reaction mixture if heat is being generated from within and supplied from without. Homogeneous gas reactions take place rapidly and the temperature rise is rapid. It is therefore impossible to simultaneously supply heat for ignition and dissipate the heat of reaction. In the production of oxygen containing compounds of hydrocarbons in the vapor phase ignition should take place evenly throughout by contact after which the reaction period and the temperature are held to the optimum. Separate heating of the oxidizing gas under pressure and the hydrocarbon gas under pressure followed by subsequent contact between the gases puts the control of reaction beyond the zone of heat input required for ignition. Ignition and reaction are therefore subject to separate control. Too much emphasis cannot be laid upon the control of reactions between hydrocarbons and oxygen as it is the control and not the reaction which is difficult to obtain.

CONVERSION

The products from the partial oxidation of mixtures of light gaseous hydrocarbons prior to carbon oxides and water will in general consist of many compounds, some of which are water soluble, others oil soluble, unless precautions are taken to produce a specified type of compound. Where air is used as the oxidizing gas and where "fixed" gases remain after the reaction, a portion of the products of oxidation will remain in the gases and another portion will condense out as liquid. The average volatility of the total and combined oxidation reaction products is high. When these products are admixed with a heavier oil fraction and then subjected to heat, a conversion between the two takes place and compounds of an intermediate nature result.

In the strictest sense, neither cracking or decomposition takes place, as the chemical reactions are rather those of conversion in which oxygen performs a major role. The conversion mixture is intermediate between light natural gas and comparatively heavy crude oil or fraction thereof. The injection of "fixed" gases, which

in the event air is used, contain nitrogen, forms a conversion mixture such as tends to produce vapor phase under pressure at comparatively low temperatures. The reaction then takes place homogeneously wherein the identity of the original constituents of the mixture disappear to reappear in converted form.

When oil is "cracked," large molecules are broken up to form smaller ones. But cracking does not end with the production of light hydrocarbons as ends heavier than the original are produced. The distillation range of the "cracked" product is lengthened in both directions. This condition of producing heavier hydrocarbons may be avoided in conversion wherein an oxidation product of hydrocarbon gas is admixed with an unoxidized hydrocarbon liquid, nitrogen injected, and the mixture subjected to heat and pressure for conversion. Oxygen as well as heat assists in the conversion. Any light hydrocarbons such as methane, ethane, etc., which might remain in the fixed gases injected for purposes of vapor phase would retard the formation of such gases by conversion of the heavier products in accordance with the laws of mass action. In brief, they, too, would become a part of the conversion mixture undergoing heat treatment under pressure.

CHOICE OF HYDROCARBONS FOR PARTIAL OXIDATION

All classes of hydrocarbons are susceptible to the action of oxygen. The unsaturated hydrocarbons are chemically more active than the saturated hydrocarbons and therefore their reaction with oxygen may be more readily obtained. In a mixture of gases in which both the saturated and the unsaturated hydrocarbons existed, one would anticipate that on heating and contact with oxygen, the unsaturated would be first attacked. The saturated hydrocarbons such as occur in natural gas, are comparatively chemically inactive, but the reaction products from contact with oxygen (carbon dioxide and water excluded) are rather easily reacted and may be subjected to pressure and heat for conversion into liquids of higher molecular weight. They are further more reactive toward other unoxidized hydrocarbons and with themselves.

In general for the preparation of an isolated partially oxidized hydrocarbon, it is preferable to use a single compound as the initial raw material. Thus in the preparation of ethylene by oxidation of a saturated hydrocarbon, the best results and highest yields would be obtained when using ethane

$$C_2H_6 + \tfrac{1}{2}\ O_2 \rightarrow C_2H_4 + H_2O$$

Ethane may be prepared from natural gas condensates in a high state of purity by fractionation. The logical approach would be to fractionate and purify the raw material in so far as possible rather than to treat a mixture and purify and separate the desired compound from the reaction mixture.

Natural gas is an ideal raw material for the manufacture of higher hydrocarbons and oxygenated hydrocarbons because of the relatively small number of compounds present. In this respect it has an advantage over crude oil and its fractions. Therefore in the preparation of oxidized hydrocarbons for use in oil conversion it is preferable to treat the gas with oxygen rather than the oil. That is, despite the fact that a heavy oil may be oxidized at lower temperatures and pressures than natural gas, the composition of the initial material is so variable and complex that it is impossible to determine what the resultant product will be. The products from the partial oxidation of natural gas are more suited to the conversion of oil than the partial oxidation products of crude oil are suited to the conversion of natural gas. The oxygen would be more securely bound with the heavy oil so that its action on the oil would be complete, water and carbon oxide formed, and no conversion with any admixed natural gas hydrocarbons made. It is therefore better to treat the more difficult oxidizable hydrocarbons of natural gas and then rely upon the action of these products of oxidation for effecting oil conversion under the application of heat and pressure.

VAPOR PHASE UNDER PRESSURE

Mixtures of liquids have their critical points as well as pure compounds. The same applies to mixtures of liquids and gases. It is therefore possible to inject sufficient light material, both liquid and gaseous, with a heavy fraction of crude oil or crude residuum, and by slow conversion produce a full vapor phase, regardless of the pressure used. The only requirement is that the critical point of the mixture be exceeded. Methods for approximating the critical points of mixtures are available and have been previously discussed by the writer.

A logical question would be, why produce vapor phase under pressure when the same may be produced at lower pressures (sub-atmospheric) without the addition of lighter gases such as nigen? This has in part been answered, as no pressure, however high, will produce liquefaction of a mixture the temperature of which is above the critical temperature. One has therefore the advantage of an unlimited pressure range which retards the formation of the fixed gases and can be made to greatly increase the yields of the more desirable products such as, for example, motor fuel. Vapor phase under high pressure is desirable from the standpoint of "coky" carbon formation as in the forced circulation through a tube coil in a furnace; the extreme turbulence and high velocity retard its formation and keep the tubes clean. With oxygen admixed in the combined form, the formation of carbon may be entirely avoided.

Then again there is the effect of surface. In common parlance a surface conjures up a solid body with sides or the surface of a liquid. In the sense as used here, surface refers to molecular surface and in particular to that of the nitrogen molecules. One gas admixed with another is influenced by molecular attractions at the interface of the molecules. Under pressure the proxim-

ity of the molecules becomes closer and the surface effects therefore become more pronounced. The surface of the nitrogen molecules admixed with oil and the product of the partial oxidation of hydrocarbon gases seems in some way to promote reaction and conversion between the constituents. It is probable that the nitrogen molecules become activated. Such nitrogen activation has been noted in other reactions under pressure by W. A. Bone and his associates.

One would therefore not anticipate identical results if a gas such as helium were used to replace nitrogen in an oil-gas conversion mixture. The effect of pressure on hydrogen is considered by some investigators to cause molecular hydrogen to assume an active state resembling that of the atomic form. Some similar effect is also probable with nitrogen when heated under pressure with carbon hydrogen oxygen compounds undergoing chemical reaction.

Vapor phase conversion, under pressure of hydrocarbons in the presence of combined oxygen is therefore not comparable with vapor phase cracking of oil at low pressures. The conditions are not the same and the overall results are not similar.

The present trend of oil "cracking" may be said to be in two directions (1) to get increased yields of motor fuel by the use of high pressures and (2) to get a higher quality anti-knock motor fuel by the use of vapor phase at low pressures with sacrifice in yield to fixed gases and carbon. The spread in price between "premium" anti-knock motor fuel and ordinary grades of gasoline warrants a difference in the cost of processing and the loss of considerable cheap raw material. Among the objectives of oil-gas conversion are (1) to lower the cost of raw material by the use of natural gas or other cheap hydrocarbon gas, (2) to increase the yield by use of high pressure, and (3) to improve the quality by the use of vapor phase.

Role of Sulphuric Acid in the Treatment of Pressure Distillate

(*Continued from page 605*)

SUMMARY OF ACTION OF SULPHURIC ACID

1. The boiling range of the distillate is raised slightly throughout the distillation range due to polymerization of the unsaturated hydrocarbons. The boiling range will be elevated in proportion to the amount of acid used, the time of agitation, and the temperature during the treatment.

2. The color of the rerun overhead is 25+. Some cracked distillates, for instance, distillate cracked from Smackover crude, are difficult to treat with acid in order to obtain a good color on the rerun overhead, but by using combinations of the doctor solution and sulphuric acid, good color can be produced on practically any type of pressure distillate. There is an optimum amount of acid to use to obtain good color. The following treats show the effect of varying amounts of acid on the color.

Lbs. acid/bbl. oil	Color of rerun gasoline
0	8
1	16
2	17
3	21
5	25
6	27
9	22
10	21
15	20
20	20
40	20

As shown by these laboratory tests, the use of insufficient acid or the use of excessive acid results in a poor rerun color. There is a range wherein a good rerun color can be obtained; this range will vary with the nature of the distillate. A slightly cracked distillate will not be as susceptible to "Burning" (or the use of excessive acid) as will a heavily cracked distillate.

3. Although the sulphur reduction due to acid treatment is apparently small (.15% to .12%), on rerunning the acid treated distillate, the sulphur content of the rerun overhead has been reduced considerably. For instance amyl mercaptan, which boils at 252°F., is converted by the acid treatment into amyl disulphide, which boils at about 490°F. The amyl disulphide, therefore, will remain in the rerun bottoms and the sulphur content of the rerun overhead is reduced.

4. The gum, both copper dish and potential is reduced by acid treatment and rerunning. The following treats show the rate of decrease for various amounts of acid:

Lbs. acid/bbl. oil	Potential gum on rerun overhead, after 4 hours at 212°F. and 100-lb. oxygen pressure
0	274 mg.
1	268
2	243
3	196
5	143
6	92
9	46
10	22
15	12
20	3
40	0

Standard Costs in the Oil Refining Industry

PART I

G. CHARTER HARRISON
Management Consultant—Chicago

COST accounting articles in an engineering and technical magazine must be written to be of specific value to engineers and technical men who supervise the operations of industry. This one is so written.

G. Charter Harrison, management consultant, in this, the first of a series of articles dealing with standard costs, is familiar with the problems of the operators of the refining industry. In addition he knows his side of the story—cost accounting.

Mr. Harrison is not writing accounting articles for the accounting department in this series. He is endeavoring to show the refinery supervisory personnel that the standard cost system will aid them materially in handling the many problems of refinery unit operations in so far as they relate to costs. Two of the largest refining companies in this country are now using the standard costs method of accounting, applying it to all of the complex problems of accounting accompanying all of the manufacturing processes peculiar to petroleum refining. More detail of these methods will be presented in later articles.

Mr. Harrison is the author of over 50 articles on better business methods and the author of two books on accounting. He is a Fellow in the Institute of Management, Member of The American Management Association, the Institute of Chartered Accountants in England and Wales, and The Society of Industrial Engineers. He is former national director of the National Association of Cost Accountants.

IT is rather a remarkable fact that there have been only two outstanding improvements in the art of accounting since men first started to keep books. The first of these was the invention of double-entry bookkeeping. There was really nothing very fundamental about this as it merely represented a mechanical device which rendered it possible to automatically check the accuracy of accounting entries by providing for a trial balance of the debit and credit sides of the ledger. It was a considerable advance in accounting technique however, and while through the ages it has kept bookkeepers up nights in the endeavor to balance their books it has at least relieved them of what must have been the harrowing uncertainties of single-entry bookkeeping days.

The second outstanding improvement in accounting was that of standard costs, which is double-entry bookkeeping in its broadest and most fundamental sense. Under standard cost accounting there is also double-entry, firstly, a record of what has been expended, and, secondly, of what was received in exchange for this expenditure in terms of a standard return.

Whereas double-entry bookkeeping was an invention of the middle ages, standard cost accounting is a comparatively recent development. It is generally agreed that credit for the original conception of the standard cost idea should be given to the late Harrington Emerson who, about 22 years ago in his book "Efficiency as a Basis for Operation and Wages," drew attention to the limitations to the then universally accepted methods of cost accounting, and claimed that cost accounting to be of real service would have to supplement actual cost data with standards. As he pointed out, a comparison of actual costs with standard or "should-be" costs was necessary for a cost system to disclose inefficiencies or excessive costs, something, which the so-called job-order or production-order cost systems failed most dismally to accomplish.

It took a long time for accountants to realize that Mr. Emerson in his introduction of the idea of standard costs had sounded the opening note of a virtual revolution in accounting thought and technique. In the writer's case, however, Mr. Emerson's message fell upon responsive ears because, as comptroller of a large Eastern manufacturing concern, he was having trouble with the old-style cost methods. The president of the company was continuously asking him embarrassing questions which he could not answer. He would say, for instance, "I haven't the slightest doubt as to the accuracy of your cost figures, but the fact remains that some of your costs are in excess of what our competitors are selling their goods for. It looks as if our goods are costing us more than they should, or that our competitors do not know how to figure costs. Isn't there some way whereby your cost system can tell us where our costs are excessive?"

Mr. Emerson's idea of comparing actual costs with standards seemed the way out as regards that particular

problem. Mr. Emerson, however, was an engineer, not an accountant, and did not possess the accounting training necessary to give practical effect to his idea of standard costs. It was necessary therefore for the writer to design his own standard cost technique which he did and in 1911 installed the first complete standard cost system of which there is any record. This system was installed for the Boss Manufacturing Company of Kewanee, Illinois, then and now the largest manufacturers in the world of work gloves and mittens, and is operating satisfactorily today.

Following this first standard cost system there was a growing appreciation of the value of standard costs, and this was particularly so in those industries where a great variety of standardized articles were manufactured, such as, machinery, electrical goods, silver ware, bolts and nuts, automobile wheels, textiles, and musical instruments. It was to be expected, of course, that in such industries the standard cost idea would meet with the most ready acceptance and make the most rapid headway. It is obvious that in a factory where minute specifications are in effect for all materials, and where all operations are standardized and paid for on a bonus or piecework basis, the absurdity of keeping track of the same costs over and over again, as was necessary under the so-called job-order or production-order method, would hardly fail to become apparent.

SAVINGS IN CLERKS

One of the earlier manufacturers to instruct the writer to introduce standard costs was the National Cash Register Company and it was in this installation that one advantage of standard costs over the old style production-order cost method came into somewhat startling prominence. There was an enormous amount of clerical work involved in the production-order cost method—it mattered not how standardized operations were under this method, it was necessary to painstakingly record the cost of every operation performed on every individual batch of parts. When the standard cost system was introduced for the National Cash Register Company it was found that it only required 20 clerks to operate it as compared with over 100 for the production-order cost plan. In an agricultural implement factory it was found that standard costs took only five clerks as compared with 45 before.

Standard costs saved clerks and also saved the time of the factory executives. Based on the principle of exceptions, they rendered it possible, through recording "exceptions" or variances from standard, to bring cost-variation data to a focus and to give the management on a single sheet of paper a bird's eye view of a factory considered from the standpoint of cost efficiency. The primary defect of the job-order cost plant was that it was necessary, since standards were not incorporated in the cost plan, to conduct prolonged investigations of individual costs records and to compare the cost of an operation on one order with its corresponding cost on a previous order, in order to determine where variations existed. Even then the basis of comparison was merely a past performance, the efficiency of which was not known. Under the standard-cost plan inefficiencies are shown up automatically as part of the regular accounting routine. The job-order cost plan necessitated investigations to disclose whether an inefficiency existed or not, a dangerous and wasteful procedure. The standard cost plan disclosed inefficiencies automatically.

TIMES CHANGE

It is no exaggeration to say that previous to 1929 the matter of operating costs was not taken very seriously by the average oil refining company. This industry was not one in which the necessity for pinching pennies was very compelling—profits rolled in with agreeable regularity and gratifying amount and as long as the refinery superintendent could meet the demands of the sales department for the right quantity and the right quality of products, nobody bothered him very much regarding how much he spent in producing them.

But when the oil business, like every other business, began to feel the effect of hard times the situation changed very materially and practically over-night refinery superintendents found themselves subject to urgent demands to reduce costs—always a painful and difficult procedure and particularly for those who had never before felt the pinch of poverty.

All this lead to a most careful scrutiny of cost records and many a superintedent spent aching hours pouring over dreary tabulations of figures, showing costs per barrel, per gallon, per still hour, etc. trying to extract from these statements information which would help him to meet the ever increasing demands of the head office for reduced costs. For all the help they gave him, however, in many cases he might just as well have endeavored to secure light from the telephone directory, for if there was any plan devised which could successfully conceal information which might be helpful to a refinery superintendent, it is the established refinery cost system which so clutters up the cost statements with prorations and re-prorations of overhead costs as to give the figures little significance even to the man who compiled them.

The above is not criticism of refinery accountants—the cost systems in common use were designed to meet the demands of an earlier day when the primary use which was made of cost figures was in the valuing of inventories for the profit and loss statement and balance sheet. When new demands were made on this form of cost system for information it was never designed to furnish, it was inevitable, of course, that it would fail to meet requirements.

The only way to reduce costs is to eliminate preventable wastes and inefficiencies and the obvious first step towards this is a knowledge of where they are and what they amount to. Refinery superintendents attempted to secure this information from their cost records by comparing the costs of the individual operations from month to month but this procedure was of limited value be-

cause usually there was no way of determining whether the costs of the period with which comparisons were being made represented a high degree of efficiency or not. Furthermore costs varied enormously with different volumes of production and no means were provided for showing to what extent costs varied due to this cause as contrasted with variations in operating efficiency.

While the basic principles of standard cost accounting are simple enough, and indeed self-evident, the first application of these principles in the oil refining industry was a somewhat difficult and complex technical problem. It is not at all surprising that accountants in this industry have hesitated, when considering the introduction of standard costs, before embarking upon a revolutionary procedure which they instinctively feared might land them in deep water. The recent successful introduction of standard costs by two leading oil refining companies, however, has changed the situation, by proving that standard costs are entirely practicable in this industry and has demonstrated that infinitely better results can be secured by this method than any other and these with no increased clerical cost.

FINDING WHERE TO CUT

Let us for a moment consider the magnitude of the problems of the superintendent of a large refinery. He is in charge of a plant performing a multiplicity of complex operations on a great variety of products. He knows perfectly well what manifold possibilities exist all along the lines for wastes and inefficiencies of all kinds. Many of these he could and would correct if he knew exactly where they are and what they are costing his company, and it should be the function of a cost system to furnish him with this information.

Let us assume for a moment that a superintendent can clear his mind of the idea of the kind of cost statements he has been receiving in the past, those dreary statements with their infernal tabulations of costs per barrel, per gallon, etc. worked out to four places of decimals, and visualize the kind of cost statements which would help him most to meet the insistent demands of the home office for reduced costs. Obviously not being an accountant he would want his information expressed in the simplest and most direct terms—he would want the kind of statement which would tell him that he was using too much steam here—that his cost of producing steam was too high because of inefficiency of use of fuel in the boilers—that his consumption of fuel in this battery of stills was greater than it should be, etc. And above all he would want to know how his refinery costs as a whole compared with what they should be and whether he was more efficient this month than last month and in what respects. Furthermore he would not want his picture confused by the introduction of factors over which he has no control—inevitable cost increases, for instance, resulting from a reduction in the demand of the sales department or an increase in the price of chemicals.

The superintendent, however, is dependent on his organization for cost control—his foreman, assistant foreman, still men, etc. and he would want his cost statements, therefore, to show how each unit in the plant stood as regards its efficiency. In his Pipe Still unit, for instance, he would want an analysis of its variations from standard. He would want to know, for instance, to what extent costs were in excess of standard in this unit due to causes like the following:

(1) Due to not operating the stills the standard times due to lack of sales demand.

(2) Due to not operating the stills the standard times due to their having been out of operation longer than the standard time for cleaning, repairs, etc.

(3) Due to the production per hour of the stills being less than the standards set up for the different crudes charged during the period.

(4) Due to using more fuel than standard for the crudes run.

(5) Due to using more steam than standard.

(6) Due to using more labor than standard.

(7) Due to repairs having been greater than standard.

With such information the superintendent would be able to discuss costs intelligently with the pipe still foreman.

WHAT SUPERINTENDENTS WANT

Summarizing, therefore, the kind of cost statements a refinery superintendent would want, if he had his say, would be as follows:

(1) A focussed summarized statement showing how his costs in total compare with standard analyzing, the variations from standard by causes and distinguishing between variations within his control and outside of it.

(2) Detailed statement showing how the costs of each operating unit compare with standard and analyzing variations from standard by causes so that immediate steps can be taken to correct conditions adversely affecting costs of production.

It is precisely this kind of information that standard costs were developed to give.

The refinery superintendent needs standard costs today far more than ever before. The increasing requirements upon him for reducing operating costs demand that he be furnished with that control over operations which only standard costs can give. And this applies all down the line—responsibility for cost reduction must be pinned down to the men actually in a position to reduce costs—to foremen, assistant foremen, gang leaders, etc. It is only along lines which make every keyman in a refinery acutely cost-conscious that systematic and concerted action to reduce costs is possible.

Modern
Pressure Vessels

FLOYD SWINDELL
Staff Representative

A FEW years ago only vessels forged from single steel ingots were considered of sufficient strength to meet the requirement of many of the high pressure, high temperature installations in oil fields and refineries. Due to limited bridge clearances on the railroads and the highway laws of most states, designers were handicapped by the limited diameter to which equipment could be built in the factory and transported to distant points. Recent improvements in the art of welding have enabled manufacturers to fabricate at strategic points, vessels of almost any desired length and diameter and for all hazardous uses. Joint strength of the modern fusion welded pressure vessel closely approaches that of the pierced steel ingot vessel and in many instances vessels of the former type can be supplied where it would be impossible to transport and erect the latter.

There seems to be no general understanding of the art of modern welding among oil men although scientific and trade journals devoted considerable space to it during the past two or three years. Also it is doubtful that more than a small percentage of those engaged in the actual use of high pressure equipment are familiar with the technique employed in its construction and the extreme care which is being taken to make it safe under hazardous uses. For that reason it is proposed herein to discuss briefly the art of welding, its effect on

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From top to bottom: (1) Formed heads are received from the mills; large heads are pressed by only a few manufacturers. (2) Plates for the shell are stocked in various sizes and thicknesses. (3) Plates are sheared to exact size in the gauge shear and (4) beveled to permit penetration of the weld. (5) Shell plates are bent to circular form in plate rolls.

Construction of *by* Fusion Welding

the modern pressure vessel, and to outline the procedure followed in constructing equipment of this type.

Welding may be divided into two general classes: forge welding and fusion welding. The first class is that type employed by the blacksmith wherein the opposite sides of a joint are overlapped and hammered together at high temperatures. The second class, or fusion welding, involves the actual fusing of the metal on each side of a joint in such a way as to cause one to flow into the other, making under good workmanship, a metal which is equal to or closely approaches the quality of the base metal. Although forge welding is still employed in certain types of vessels and at one time was the only method known, much high pressure equipment for the oil fields and refineries, is now fusion welded.

Probably one of the greatest single contributions to fabrication technique has been the development of a type of welding which is collectively known as "Shielded Arc Welding." Different manufacturers resort to slightly different procedure in the process but fundamentally it involves the fusion of metal in a neutral or reducing atmosphere as opposed to the open arc method which was carried on in oxidizing atmosphere. With the open arc it was impossible to complete a weld without the

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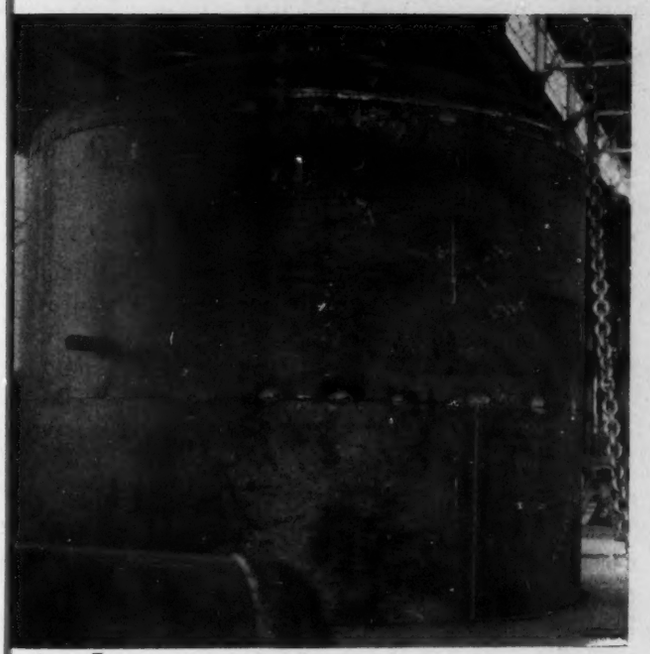

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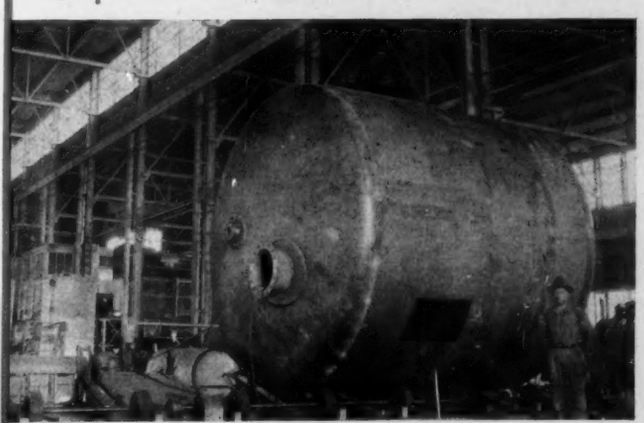

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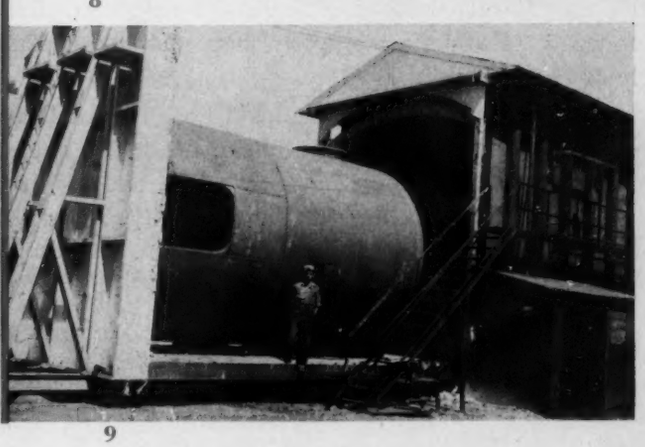

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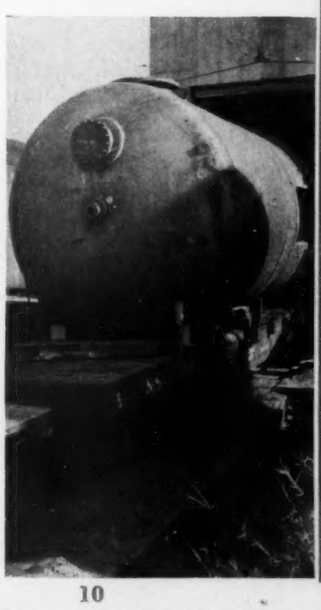

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(6) Heads have connections welded in place, and (7) the vessel is tacked into one piece, after which it is (8) placed on the trunion or rotating table for automatic welding of all seams. (9) The completed vessel goes into the annealing oven to be stress relieved at a temperature of 1100 F. (10) From the oven to railroad car after hydrostatic pressure test.

formation of iron oxides and nitrides through union of oxygen and nitrogen from the air with portions of the deposited metal. This tended to give a brittle joint. With the shielded arc, oxygen and nitrogen are excluded from the atmosphere immediately surrounding the weld and the two worst impurities have been eliminated. Many welds of this type result in joints which are superior to the base metal.

With the development of this type of welding it is now possible to join together homogeneous metals of different shapes and thicknesses thereby permitting the designer to incorporate the highest efficiency into equipment without the handicap of dimension. One of the recent examples of the advantage of modern fusion welding was the construction, by a large Mid-Continent refiner, of a cracking tower having a wall thickness in excess of three inches. This vessel could not have been forged welded and probably would not have met safety requirements if welded by the open arc method.

To the casual observer the construction of a modern fusion welded vessel probably would not be impressive since outwardly it appears entirely routine. However, almost every vessel is a separate problem. Under the A.S.M.E. code all connections must meet definite specifications. Quoting at random from the code of 1931 may give some idea of the amount of engineering skill incorporated in a pressure vessel.

"U-71. Material. a The materials used in the fabrication of any fusion welded pressure vessel covered by this Code shall conform to Specifications S-1 for Steel Boiler Plate... The carbon content in all such material shall not exceed 0.35 per cent."

"U-72. Preparation for Welding. The plates of sheets to be joined shall be accurately cut to size and formed. In all cases the forming shall be done by pressure and not by blows, including the edges of the plates forming longitudinal joints of cylindrical vessels.....

"If the thickness of the flange of a head to be attached to a cylindrical shell by a butt joint exceeds the shell thickness by more than 25 per cent (maximum ¼ in.), the flange thickness shall be reduced at the abutting edges as shown in Fig. U-15.....

"The design of welded vessels shall be such that bending stresses are not brought directly upon the welded joint. Corner welds shall be avoided unless the plates forming the corner are properly supported independently of such welds."....

"U-73. Joints. a, Longitudinal. Longitudinal joints on Classes 1 and 2 vessels shall be of the double-welded butt type and shall be reinforced at the center of the weld on each side of the plate by at least 1/16 in. up to and including ⅝ in. plate, and up to ⅛ in. for heavier plates.....

"b. Where vessels are made up of two or more courses with welded longitudinal joints, the joints of adjacent courses shall be not less than 60 deg. apart.

"c. Circumferential. Circumferential joints on Class 1 vessels shall be of the double-welded butt type. Circumferential joints on Class 2 vessels shall be of the double-welded butt type except for thickness of ⅝ in. or less, in which case they may be of the single-welded butt type. Circumferential joints on Class 3 vessels may be of the butt or lap type....."

"U-75. Inlet and Outlet Connections. Pipe connections may be made as provided for in Par. U-59.

"Nozzles may be fusion welded, with or without reinforcement, to the shell or to the spherical portions of the head (see Fig. U-16). When the inside diameter of the vessel is 36 in. or greater, the inside diameter of an unreinforced fusion-welded nozzle shall not exceed that given in the following equation:

$$d = 0.1155 \frac{D}{K} \sqrt{6K - 5K^2 - 1},$$

where d equals maximum allowable inside diameter of nozzle in inches; D equals inside diameter of shell in inches; and K equals computed stress in the solid plate to one-fifth of the ultimate strength stamped on the plate, equals $\frac{PR}{ST}$. If K is less than 0.333, the maximum allowable value of d shall be 0.231 D."

These are a few of the more simple rules by which the designer and fabricator of the modern pressure vessel must be guided. Recent fabrication of an unusual type of vessel by the American Tank and Equipment Corporation (manufacturing subsidiary of Black, Sivalls & Bryson, Inc.) in its plant at Oklahoma City illustrates very nicely the procedure followed in the modern plant. The manufacture of this particular vessel is quite out of the ordinary due to the large diameter, which is 13 feet and two inches through the extreme edges of the base and 12 feet and two inches outside diameter of the vessel. Complete weight of the vessel is approximately 34,000 pounds. Plates one to 10 show the procedure from arrival of the formed heads in the plant to loading the completed vessel on a flat car for delivery to the buyer.

Consideration of the rigid rules under which modern fusion-welded vessels are constructed may serve to give the user of equipment a greater feeling of safety when standing alongside vessels operating under extremely high pressures and temperatures since under the A.S.M.E. Code, which is predicated on the opinions of men of long experience, every thought has been given to safety. The Code of 1931, which is more generous than those which preceded it, probably will be further modified to meet the needs of the oil industry. However, knowing the attitude of the modern manufacturer it is safe to say that modifications will not be made at any great expense to the safety of vessels constructed in the plants of reliable concerns.

Synthesis . . . IN THE Refining Industry

GEORGE REID

PROGRESS in technology of petroleum refining, especially in the field of cracking, both liquid and vapor phase, in the field of synthesis, where refining bids fair to overlap importantly with the chemical industries and at an earlier time than anticipated by many, in the fields of fractionation and solvent extraction, and other phases of manufacture and utilization, augers that the technical supervisory and operating personnel of the industry will continue to find it extremely interesting, as well as valuable, to closely watch developments.

Although the refining industry is confronted on the one hand with further decrease in demand for its major product, gasoline, according to present forecasts, on the other hand it is being requested to continually better the quality of its motor fuels. A similar condition exists with reference to motor and gear lubricants, where the condition is aggravated by a shading of prices. Around nine million barrels of lubricants, however, must be provided for use in motor vehicles equipped with smaller but more powerful power plants, and gears demanding the best in extreme pressure lubricants. The automotive industry is presently establishing a definite trend toward smaller cars, more powerful, and with higher-speed driving range than formerly. The larger cars also are increasing their speed ranges, increasing power, and attempting to offset natural increased consumption of gasoline by adopting various modifications of extreme stream-line design. The new cars, however, do not threaten to seriously affect specifications of fuels and lubricants, and with the exception of continued raising of compression ratios which in turn influence octane rating of motor fuels, developments in the automotive industry will not seriously affect refinery processes and processing soon.

Influences outside of the industry will not affect and contribute to further expansion in various departments of the refining industry. The current transition is due principally to technical progress within the industry, given added impetus two or three years ago when the automotive industry began boosting compression ratios. This "race for octane" must continue, for the reason that automobile manufacturers are bent upon providing greater flexibility, greater acceleration and more power, to smaller power plants. To reach this desirable automobile market the modern low priced car must more than equal the performance of its predecessors in a high priced field of four to five years ago. All this has resulted in the "race for octane" experienced in the refining industry. Yet the race is not run.

The refining industry has found that equipment installed for the preparation of motor fuels of four to five years ago is not designed to compete with lately developed units and processes. Last year refiners modernized and rehabilitated over 100,000 barrels of cracking capacity, bringing those units to more nearly approach the performance of modern facilities. About the same capacity is slated for modernization next year. The industry is adding cracking capacity at the rate of 100,000 barrels per year, and there is little to indicate an abatement of this practice for there remain a large number of refining companies not yet engaging in cracking. Through obsolescence and abandonment around 150,000 barrels capacity must be replaced annually.

The influences of natural expansion, replacement of obsolete equipment, and modernization of existing facilities are aided and abetted by competitive conditions within the marketing branch of the industry on the one hand, and the specific needs for better fuels on the other. Add to that, continued improvements in design of processes, securing greater efficiency in furnaces, tubes, fractionators, and auxiliary equipment, prime movers, control equipment—in other words, the advance of technology, and while the completed picture shows plainly the influence of a number of contributing factors, the principal need remains—modern efficiency through modern equipment.

Despite the lowered demand for motor fuel during the past several months, and despite lowered crude runs to stills, the production of cracked gasoline has not materially declined. Proportionately, cracked gasoline constitutes about 25 per cent of the basis of crude runs, with straight run gasoline recovery slightly lower. There has not been sufficient production of cracked gasoline to meet the demand for quality motor fuels, and regardless of the present enlarged cracking capacity of the

industry, there is not sufficient capacity in the cracking department. Further, many of the 145 companies operating refineries without cracking facilities, realize that they can not much longer market straight-run solely, and must crack and perhaps engage in some naphtha reforming.

An analysis of shut down cracking facilities in this country proves of interest for the reason that 85 per cent of the total shut down capacity is reported by 10 of the 35 largest refining concerns. These 10 companies report about 330,000 barrels shut down cracking capacity, representing 420 units. In the other group of smaller companies, 64 units are reported shut down, totaling about 64,000 barrels cracking capacity. The most interesting factor in this analysis comes from the knowledge that much of the cracking capacity reported shut down by the group of 35 larger concerns is comprised of old units, for the most part, old processes now being abandoned, such as the Burton and Sinclair Refining Company's older process. The latter company has completed its modernization program, but several of the other concerns have yet to replace the cracking facilities installed several years ago. Some of this expansion or replacement of cracking equipment is under way, some has been announced, and the remainder will come with time.

Available reports indicate that total cracking capacity for the industry is slightly more than 2,000,000 barrels per day, and includes about 1350 cracking units. However, out of these totals, it is found that about 400,000 barrels capacity is shut down (including around 485 units). For the most part this capacity and this number of shut down cracking units, are shut down either because of the obsolescence of the process or the hazards of operating old equipment, and for the most part, this shut down equipment will be replaced, especially that portion of it which is reported by the larger concerns included in the group of 35 leading refining organizations.

Synthesis and Solvents

This year has seen rapid progress in the field of lubricating oil manufacture, especially with regard to solvent or extraction processes. Synthetic lubricants were perfected commercially by Standard Oil Company (Indiana), Standard Oil Company of New Jersey began commercially producing lubricants by means of the hydrogenation process, and Gulf Refining Company applied the aluminum chloride process to the production of lubricants. The phenol process of the Imperial Oil Company, Ltd., became of importance to its developers and owners, and the Edeleanu process was modified to include the use of a dual solvent—benzol and sulfur dioxide. (Refiner, Nov. 1932, page 553). Atlantic Refining Company announced details of its Nitrobenzine process for lubricating oil manufacture in November (Refiner, Nov. 1932, page 560). These and other developments (Refiner, Oct. 1932, page 528) have come about through the efforts of refiners to provide lubricants to meet the higher qualities demanded by modern motors and machinery.

In the field of synthesis, not including lubricating oils or other petroleum products, the refining industry has been gradually encroaching on the markets of the strictly chemical industries. Discussions of processes for chlorination, oxidation and syntheses have been presented in these columns during the year, all of which point to the definite establishment of a trend toward greater use of the parent hydrocarbon by industry generally.

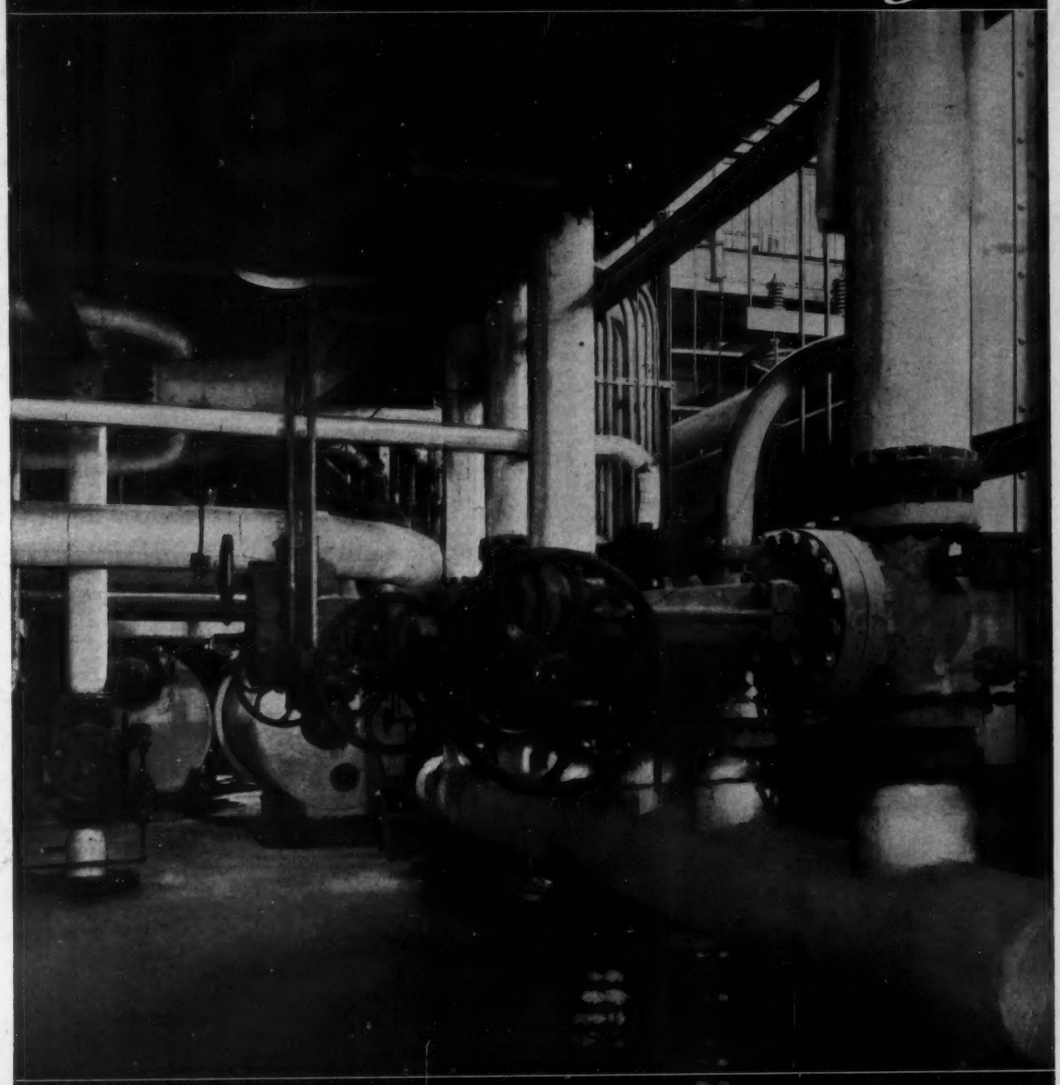
The trend toward this overlapping with the chemicals industries is well recognized by the technical leaders of the refining industry. Its importance was emphasized recently at a meeting of the Institution of Petroleum Technologists, London, when J. B. Aug. Kesslar, managing director, Royal Dutch Group, addressed that body. His remarks concisely pictures the important trend when he said: "The work done by the chemists has been enormous, and still I feel that we are only at the beginning of the developments of the chemical side of our business. I expect that in the next few decades the oil industry will develop more and more along scientific and chemical lines, and that some 10 or 20 years from now we shall hardly consider an oil refinery as we know it at present as deserving the name . . .

"Whereas, in the beginning of the oil industry the drilling of wells absorbed most of the capital, after which we went through a period when transport and distribution required most of the money, I think that, in the future, it will be the refining business that will be the most costly . . .

"I may not be far wrong in saying that in scientific development the oil industry is now where the coal industry was some 30 to 40 years ago. Nature's wealth of coal, combined with large capital and the most thorough chemical research over a period of many decades, has resulted in a chemical industry largely built on coal derivitives. We are a long way behind anything comparable with that achievement.

"It is the opinion of many petroleum technologists that with the experience of the coal industry and its researches behind us, and with the availability of modern facilities and modern chemical and mechanical knowledge, the petroleum refining industry is in a position to duplicate the achievements of the coal industry, and to do so within a much shorter span of years. The search for new uses, and the search for new products to secure new profits is spurring this activity onward and the list of petroleum derivitives is certain to be rapidly enlarged during the next few interesting years."

Surplus Safety



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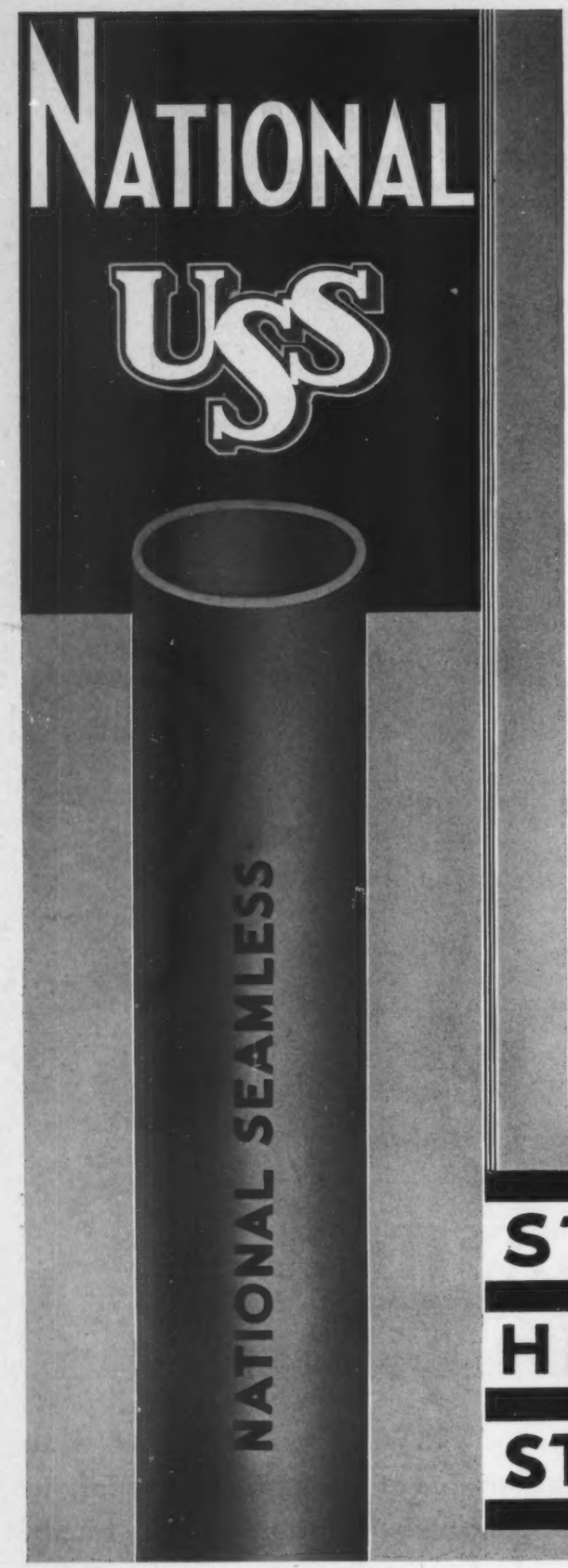

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THE MONTH IN REVIEW

W. P. R. A. Sponsors Gasoline Contract

THE Western Petroleum Refiners Association is sponsoring a new marginal contract for gasoline as follows: Contract based on average spot price of 57 to 64 octane U. S. motor gasoline as quoted by the Chicago Journal of Commerce with a minimum and maximum guarantee of 4½ to 5½ cents per gallon made flexible by a clause which provides that when the margin on the spot price exceeds 5½ cents per gallon to the jobber, the jobber will allow the refiner a 50 per cent share of any margin in excess of 5½ cents and when the jobber's margin on spot price falls below 4½ cents per gallon the refiner will allow a 50 per cent share of any margin below 4½ cents.

The contract also carries a stop clause protecting the refiner whenever one gallon of gasoline nets the refiner less than the cost of two gallons of 38 gravity Oklahoma crude as published by the Carter crude reporting agency. No advertising is given by the refiner on this contract.

Complete Organization of Conservation Association

ORGANIZATION of the Texas Oil & Gas Conservation Association was rounded out during a meeting held December 14 by the executive committee of nine members, who were appointed late last week. Fort Worth was selected as headquarters, and E. H. Eddleman, Wichita Falls, will be the paid executive vice-president. Charles F. Roeser, president of Roeser-Pendleton, Inc., was elected president of the association during a general meeting of operators on November 6 that resulted in a permanent body being formed. On the following week he was elected a vice-president and chairman of the general committee of the division of production for the American Petroleum Institute.

The personnel of the executive committee of the Texas Oil & Gas Conservation Committee includes: E. L. Smith, E. L. Smith Oil Company, Mexia; W. L. Todd, Columbia Oil & Gas Company, Dallas; Roy B. Jones, Panhandle Refining Company, Wichita Falls; George Sawtelle, Kirby Petroleum Company, Houston; Clifford Mooers, Shasta Oil Company, Longview; Frank P. Zoch, San Antonio; Joe R. Pearson, Tyler; George Morgan, Cardinal Oil Company, San Angelo; and Colonel J. Lewis Thompson, Kilgore. E. A. Landreth, Landreth Production Corporation, Fort Worth, was elected treasurer, and also chairman of the finance committee. Dennis Mason will be secretary.

Eddleman began his duties as executive vice-president December 21, having arranged for his resignation as general manager of American Refining Properties, owner of the largest refinery in the Wichita Falls area. He is a graduate of the University of Texas, and practiced law prior to his entrance into the oil business as a department head for Texhoma Oil & Refining Company, which was absorbed in January, 1926, by Continental Oil Company. His services with American Refining Properties began shortly after the conclusion of this deal.

Colorado Permits Colored Gasoline

THE Colorado law forbidding the sale of colored gasoline at a premium price unless it possessed "special qualities," was declared unconstitutional by Judge E. V. Holland in the Denver district court, December 3. Under the law as administered by the Colorado state oil inspector, Ethyl gasoline has had a practical monopoly in the colored, premium priced field. The suit was brought by Derby Oil Company, Wichita, Kansas, which company was seeking to sell "Flexgas" as a colored product at a premium of three cents.

No Second Grade Ethyl Gasoline

ETHYL Gasoline Corporation announced the definite withdrawal of its proposed contract covering the use of lead in non-premium gasoline in the United States, December 24, 1931. In a letter to all users of Ethyl compound, E. W. Webb, president of Ethyl Gasoline Corporation, stated:

"The proposal for the use of lead in non-premium gasoline was formulated as a result of requests from a considerable number of our distributors. When submitted it was opposed by not only a large majority of distributors but also by some of those who had urged such a policy.

"After thorough consideration of the matters we believe that under existing conditions Ethyl Corporation should devote its undivided efforts to the stimulation of premium fuel business. Despite adverse economic conditions it is believed that basic technical changes in automotive design, in response to public demand for superior motor performance will lead to material growth in premium fuel sales over the next few years. The Ethyl corporation proposes, with the co-operation of its customers, to take definite steps to accelerate this growth.

"It has therefore been decided to withdraw the proposal for use of lead in non-premium gasoline in the United States."

An Added Service for Technical Men

As a further step to improve the service of THE REFINER AND NATURAL GASOLINE MANUFACTURER to the reader, effective with this issue the Volume System of indexing of technical articles has been adopted. All technical articles throughout the year will be numbered or indexed consecutively to facilitate filing and reference. Advertising pages are numbered separately from editorial pages. This system of indexing is used by the more technical publications and it is hoped that it will prove of benefit to the many readers of THE REFINER who maintain technical files.

ECONOMICS

By H. J. STRUTH, *Staff Economist*

Prices Show Improvement

SUPPORTING the favorable turn recorded during November was the upturn in the industry's price structure. The composite index of prices in the November barometer registered a net gain over November of last year of about five per cent. Crude oil prices in the Mid-Continent area increased from an average of 62 cents a barrel in October to 77 cents a barrel in November. Compared with a year ago, the price of Mid-Continent crude is up about 30 per cent. Gasoline prices increased about one cent a gallon in November, while natural gasoline showed an advance of about three-eighths of a cent a gallon.

Lower Crude Production Reduces Stocks

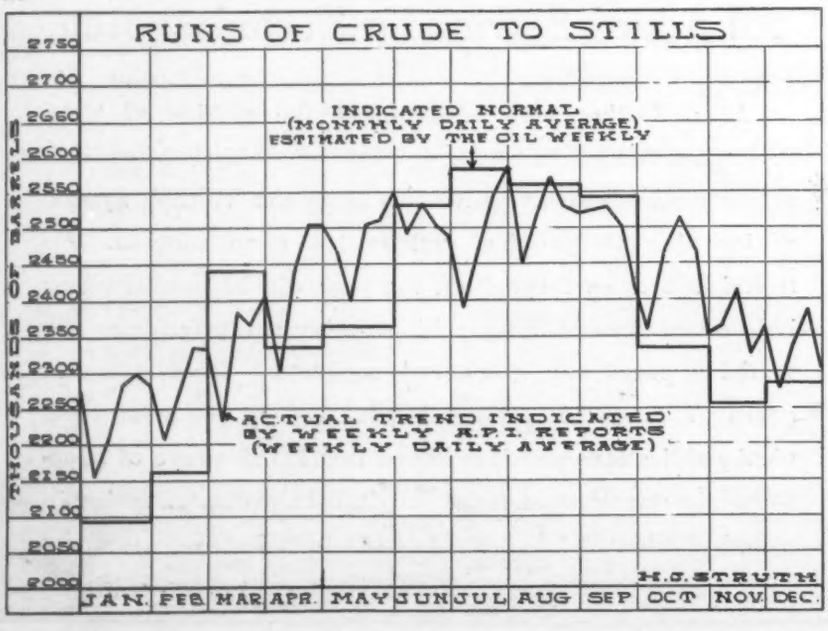
A FURTHER decline in United States daily average crude oil production during the week ending January 2, amounting to 83,800 barrels, apparently resulted in a draft on crude stocks of about 42,900 barrels daily. The crude production curve has receded to a daily average of 2,209,000 barrels, whereas refinery runs during the same period averaged nearly 2,300,000 barrels daily. Since it has been recognized by leaders of the industry that refinery runs are too high, it is seen that present production of crude oil is not actually below current market requirements. Refiners are undoubtedly running too much oil through stills, leading producers to believe that the market demand for crude oil is actually larger than current production. The curtailment movement by producers is having a beneficial effect upon the oil supply situation but until refinery runs are reduced to at least 2,100,000 barrels a day, there is little liklihood of general market improvement.

Survey of Fuel Oil Distribution

DELIVERIES of gas, oil and fuel oil during 1930, as reported to the United States Bureau of Mines, by oil refining and marketing companies, totalled 385,080,162 barrels, including exports and shipments to non-contiguous territories, as compared to 411,149,930 barrels in 1929, 397,660,095 barrels in 1928 and 381,662,801 barrels in 1927.

Reports received for 1930 showed a domestic distribution of 348,630,278 barrels as compared with 371,999,098 barrels during 1929. There was a decrease in exports of these products which totalled 2,700,948. The decrease in total distribution during the past year amounted to 26,069,768 barrels, of 6.34 per cent.

The report is very thorough in its coverage of the situation and indicates demand by industries, states and countries, giving a complete picture of fuel oil distribution. The report was prepared by A. T. Coumbe, Jr., A. H. Redfield, and E. B. Swanson of the Bureau of Mines and early distribution was made possible by arrangement with the American Petroleum Institute for its printing.



The Barometer Chart for November

CHANGES of a constructive nature were revealed by oil supply and demand statistics for November, which contrasted sharply with those of October and reflected marked improvement over a year ago. The barometer chart, appearing elsewhere in this issue, shows that while there were a number of unfavorable factors in the November statistics, the composite indices of supply and demand showed a more pronounced tendency to converge and supported the contention that the advance in crude prices on November 2 was justified. Conspicuous among the unfavorable factors of November was the continued excessive rate at which crude was run through refinery stills. While runs for November were materially lower than in October, the quantity processed exceeded that of November a year ago, despite the fact that total consumption of refined products has been running somewhat less than last year. In November the percentage of gasoline yield from crude averaged 46 per cent, against 41.66 per cent a year ago. The gain in gasoline recovery emphasized the excessive degree to which refineries have been operated.

Domestic Gasoline Consumption Above 1930

CONSUMPTION of gasoline in the United States for the year 1931 will have amounted to about 408,000,000 barrels, an increase of 3.3 per cent over 1930. This is a remarkable record in view of reported declines in consumption of practically all other commodities. There was a decline, however, in the quantity of gasoline exported to foreign countries, the total shipments having dropped from more than 65,000,000 barrels in 1930 to but 46,000,000 barrels in 1931. While the total gasoline consumption, domestic plus exports, was lower in 1931 than in 1930, marketers in the United States enjoyed increased business last year, despite the general business depression.

Gasoline Over-Supply Upset Market

DESPITE the fact that there was actually an increase in the volume of gasoline sold in the United States during 1931, the petroleum industry was unable to obtain a fair profit from such popular demand. The reason that prices reacted to their low levels last year was because there was a continued over-supply of gasoline, resulting from over-production by refineries. Not only were stocks of that product excessive, but production exceeded current market requirements throughout practically all of the year. The

total consumption of gasoline, including foreign sales, amounted to about 454,000,000 barrels, whereas the production, plus imports, aggregated about 470,000,000 barrels. While refiners processed less crude oil in 1931 than in 1930, the yield of gasoline increased to such an extent as to create a larger supply from a lesser quantity of crude oil.

Natural Gasoline Production, Stocks Gain

NATURAL gasoline production during November increased to a total of 143,000,000 gallons, from 140,500,000 gallons in October. Stocks increased from 21,993,000 gallons on October 31 to 26,924,000 gallons on November 30. Oklahoma City and Seminole produced considerably more natural gasoline during November, production having shown a gain of nearly 3,000,000 gallons at Oklahoma City and a similar gain at Seminole. Texas and California recorded lower production of natural gasoline during November.

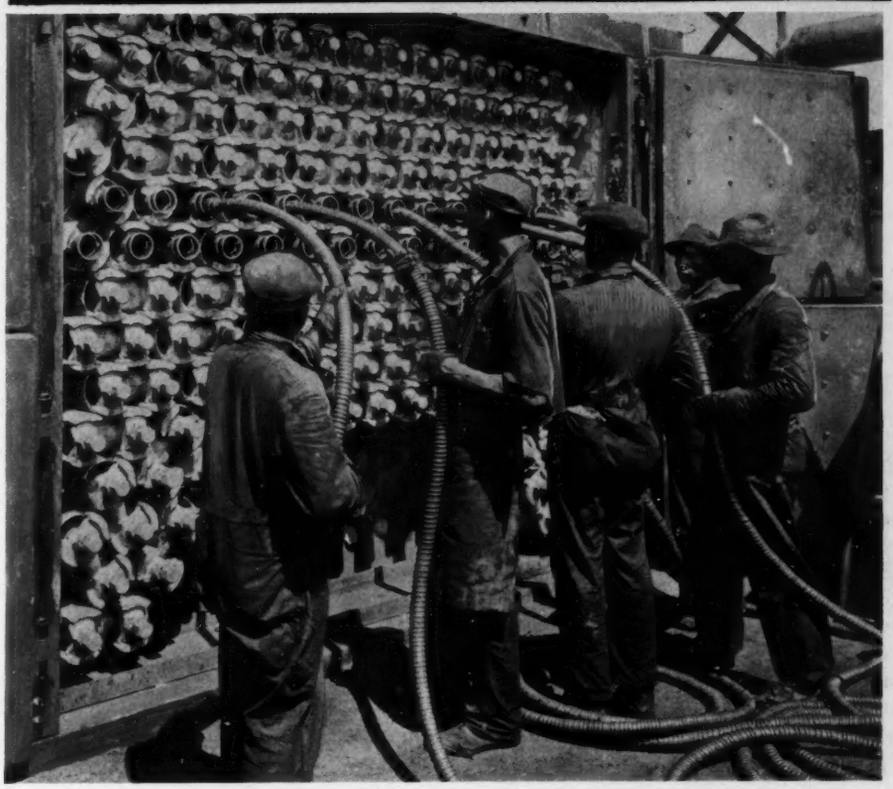
Foreign Refineries Increasing

AN increasing number of petroleum refineries in foreign countries accompanied by substantial improvements in refinery technology is reported in a bulletin just issued by the commerce department. This bulletin which was prepared in the petroleum section of the minerals division presents brief outlines of the present status of petroleum refining in 38 foreign countries as reported by representatives of the Departments of Commerce and State in those areas.

The development of the petroleum industry abroad, F. M. Feiker, director, Bureau of Foreign and Domestic Commerce, declares in a foreword to the bulletin, is of intimate concern to the American industry because of the position of petroleum products in our export trade. In 1930, a period of low petroleum prices, exports from the United States of all classes of petroleum products amounted to $494,339,000, of which refined products alone accounted for $438,195,000. This figure for petroleum exports was exceeded only by that for machinery and raw cotton.

That the market for American refined petroleum products is affected in no small measure by the refining capacity of foreign countries is indicated by the situation in connection with gasoline. The United States exported 6,543,000 barrels of this product in 1921 and 63,195,000 barrels in 1930, with each intervening year showing a progressive increase. However, the ratio of United States gasoline exports to world exports has not proved so favorable. In 1921, of the gasoline ex-

...Where haste makes savings



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X-1485

Crude Runs to Stills, Gasoline Stocks and Gas and Fuel Oil Stocks

Report for Week Ending December 26, 1931

(Figures in barrels of 42 gallons)

District	Potential Cap. (Daily) Reporting	Per Cent	Crude Runs to Stills Total	Daily Average	Per c't Operated	Gasoline Stocks (see note below)	Gas & Fuel Oil Stocks
East Coast	633,700	100.0	3,172,000	453,100	71.5	4,480,000	7,912,000
Applachian	149,600	91.8	618,000	88,300	64.3	1,330,000	1,601,000
Ind., Ill., Ky.	436,300	98.9	2,019,000	288,400	66.8	4,181,000	5,577,000
Okla., Kans., Mo.	485,700	89.6	1,422,000	203,200	46.7	†3,505,000	4,365,000
Texas	838,200	91.3	3,937,000	562,400	73.5	7,573,000	11,873,000
Louisiana-Arkansas	233,100	98.9	1,224,000	174,900	75.9	1,262,000	4,070,000
Rocky Mountain	160,900	89.4	249,000	35,600	24.8	1,665,000	750,000
California	914,500	97.1	3,025,000	432,100	48.7	*13,203,000	96,393,000
Total Dec. 26	3,852,000	95.2	15,666,000	2,238,000	61.1	37,199,000	132,541,000
Total Dec. 19	3,852,000	95.2	16,221,000	2,317,300	63.2	35,936,000	133,908,000
Total Dec. 12	3,852,000	95.2	15,896,000	2,270,900	62.0	34,826,000	133,964,000
Total Dec. 5	3,852,000	95.2	15,494,000	2,213,400	60.4	34,256,000	135,164,000
Total Dec. 27, 1930	3,730,100	95.7	15,452,000	2,207,400	61.8	†37,919,000	136,917,000
The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.							
Texas Gulf Coast	532,500	99.8	3,135,000	447,900	84.3	5,784,000	8,845,000
Louisiana Gulf Coast	147,500	100.0	817,000	116,700	79.1	1,110,000	3,168,000

Note: In all the refining districts indicated except California, figures in this column represent gasoline stocks at refineries. In *California, they represent the total inventory of finished gasoline and engine distillate held by reporting companies wherever located within continental United States—(stocks at refineries, water terminals and all sales distributing stations, including products in transit thereto).

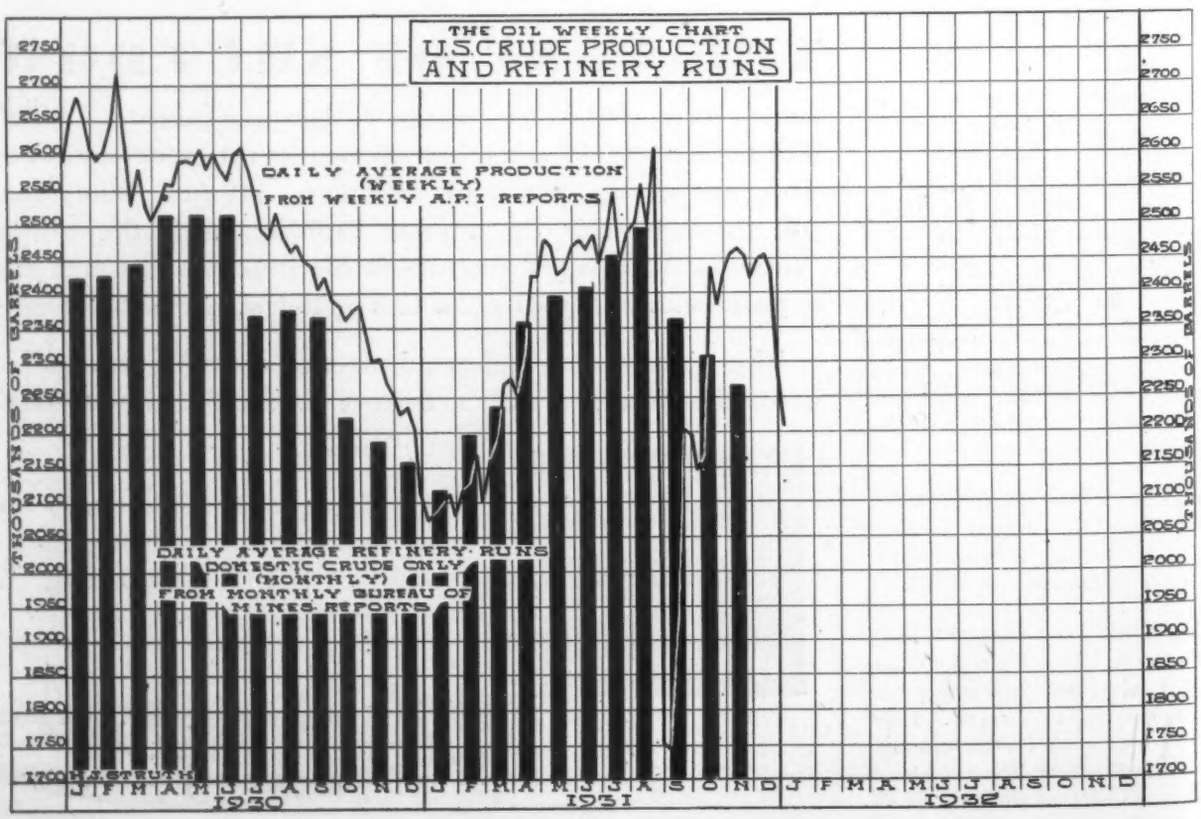
†Revised in Indiana-Illinois district, due to transfer to "Bulk Terminals" of stocks previously reported as "At Refineries."

ported by the 10 leading exporting countries, the United States accounted for 45 per cent. In 1924, the ratio had risen to a peak of 72 per cent but from that time on it began to decline, falling to 49 per cent in 1930. It is obvious, the bulletin declares, that foreign refining capacity is increasing more rapidly than foreign demand for refined petroleum products.

The present bulletin is issued as Trade Information Bulletin No. 784. Copies may be obtained for 10 cents from branch offices of the Bureau of Foreign and Domestic Commerce which are located in the larger cities throughout the country.

Oil Supply Reduced

PRELIMINARY figures compiled by THE PETROLEUM MARKETER for 1931 show that stocks of crude oil in the United States were reduced to the extent of about 47,000,000 barrels. Crude oil production aggregated approximately 851,442,000 barrels, a decrease under 1930 of nearly 48,000,000 barrels. The fact that stocks were reduced almost exactly to the extent of the decline in domestic production clearly shows the success that attended efforts to control the oil supply in 1931. Stocks of crude oil on December 31 are estimated at about 465,000,000 barrels, against 512,230,000 barrels on the same date of the preceding year.


THE OIL WEEKLY CHART
U.S. CRUDE PRODUCTION AND REFINERY RUNS
DAILY AVERAGE PRODUCTION (WEEKLY) FROM WEEKLY A.P.I REPORTS
DAILY AVERAGE REFINERY RUNS DOMESTIC CRUDE ONLY (MONTHLY) FROM MONTHLY BUREAU OF MINES REPORTS
THOUSANDS OF BARRELS
1930
1931
1932

Cracked Gasoline Production

Report for Week Ending December 26, 1931
(Barrels of 42 gallons)

District—	Potential Charging Capacity (Daily) Total	Reporting	Per Cent	Production Total	Daily Average
East Coast	261,300	236,300	94.0	646,000	92,300
Appalachian	56,300	54,100	96.1	172,000	24,600
Ind., Ill., Ky.	330,400	315,400	95.5	551,000	78,700
Okla., Kans., Mo.	237,800	219,500	92.3	341,000	48,700
Texas	450,800	436,200	96.8	830,000	118,600
Louisiana-Arkansas . .	112,400	112,400	100.0	224,000	32,000
Rocky Mountain	99,900	98,400	98.5	95,000	13,500
California	190,800	190,800	100.0	320,000	45,700
Total Dec. 26 1,739,700		1,663,100	95.6	3,179,000	454,100
Total Dec. 19 1,739,700		1,663,100	95.6	3,245,000	463,600
Total Dec. 12 1,739,700		1,663,100	95.6	3,400,000	485,700
Total Dec. 5 1,739,700		1,663,100	95.6	3,396,000	485,100
Total Dec. 27, 1930....1,589,600		1,371,800	8*.3	2,555,000	365,000
The Texas and Louisiana Gulf Coastal Figures shown below are included above in the totals of their respective districts.					
Texas Gulf Coast.....	352,400	347,400	98.6	657,000	93,900
Louisiana Gulf Coast..	77,000	77,000	100.0	159,000	22,700

Refined Oil Revenue Severely Reduced

SOME idea of the severity of the market slump for refined oil products during 1931 can be gained from the fact that the revenue from the sale of gasoline by refineries during that year slumped to the extent of about $433,000,000. The estimated wholesale gasoline revenue for 1931 was about $746,000,000, against $1,180,000,000 in 1930. This slump in values is the more to be deplored in view of the increase in domestic gasoline consumption.

Gasoline Lines Deliveries Smaller

DELIVERIES of motor fuel by pipe lines during November slumped to a total of but 1,678,000 barrels, against 1,849,000 barrels in October. Deliveries to gasoline pipe lines were practically the same as during October, but stocks rose from 1,733,000 barrels on October 31 to 1,902,000 barrels on November 30. Total deliveries of gasoline by pipe lines for the first 11 months of 1931 amounted to 11,045,000 barrels, while the quantity of motor fuel turned into gasoline lines amounted to 12,747,000 barrels.

Gasoline Exports Show Gain

EXPORTS of gasoline during November increased to 3,743,000 barrels, from 3,461,000 barrels in October. This was the first gain in gasoline exports since July and represented a gain over the same month of last year of about one per cent. Imports of gasoline declined during November to but 586,000 barrels, from a total of 1,181,000 barrels in October. The decline in gasoline imports represents a drop of about 46 per cent under November a year ago.

Louisiana Carbon Black Manufacture Off Sharply

MANUFACTURE of carbon black in Louisiana for the first nine months of 1931 showed a sharp decline from the corresponding period of 1930, according to figures just compiled by the minerals division of the Louisiana Conservation Commission, Dr. J. A. Shaw, director. For the first nine months of 1931, a total of 37,121,370.5 pounds of carbon black was manufactured in Louisiana, utilizing 39,249,711,000 cubic feet of gas, as compared to 71,357,344 pounds of carbon black manufactured for the corresponding period in 1930.

Fort the first nine months of 1931 a total of 8,370,540 pounds of gray black was manufactured by the thermatomic process in which 887,908,000 cubic feet of gas was utilized in addition to 737,201,000 cubic feet of gas used as fuel in this process. A total of 6,575,610 pounds of gray black was manufactured for the first nine months of 1930.

Lubricant Consumption Down

CONSUMPTION of lubricating oil during November declined to a total of 1,211,000 barrels, against 1,639,000 barrels in October. Exports of lubricants also showed a decline from 740,000 barrels in October to 647,000 barrels in November. As a result of this decline in demand, stocks of lubricating oil rose from 9,113,000 barrels on October 31 to 9,422,000 barrels on November 30. Domestic demand for lubricants declined during the 11 months of 1931 to 18,699,000 barrels, from a total of 20,130,000 barrels during the same period of 1930.

Exposition Posponed

THE International Petroleum Exposition planned for May of 1932, has been postponed until the fall of 1932, due to conditions in the oil business which have caused the management to change the date, believing it inadvisable to hold the show in the spring.

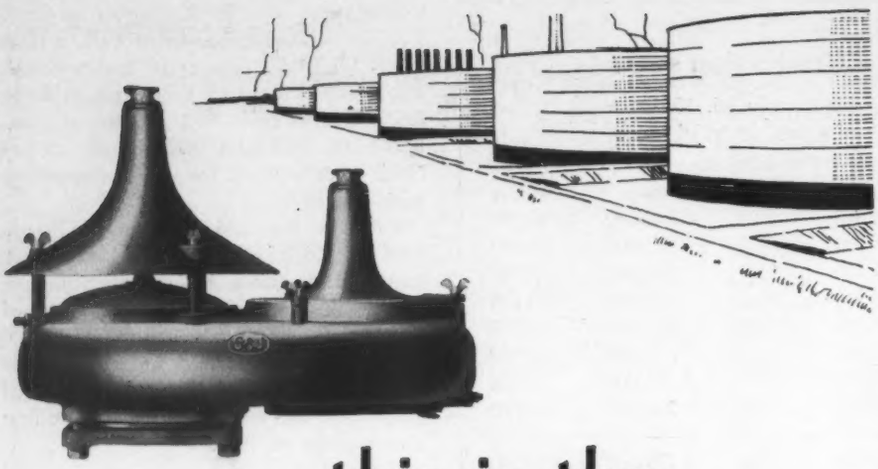
▼ TECHNOLOGY ▼

Hydrogenation In Germany

SOME interesting observations regarding hydrogenation of petroleum in Germany were presented in the news edition, Industrial and Engineering Chemistry, December 10, 1931, by Walter Roth, German correspondent in his discussion of the manufacture of benzine at the Leuna Works. Mr. Roth writes as follows:

"The gigantic Leuna works at Merseburg were built, as is known to supply Germany with nitrogen for domestic use and export trade. However, after the nitrogen trade had declined considerably as a result of overproduction in nitrogen and the difficult position of agriculture, the Leuna works laid special emphasis upon hydrogenation in order to meet the demands of the German benzine market. Fortunately the same process and equipment may be used for the synthesis of ammonia, methanol, and benzine, . . .

"With a suitable catalyst, which is now being supplied by the Leuna Works to the United States of America, the present benzine production of about 100,000 metric tons annually can be increased to between 300,000 and 350,000 tons. Since the production of tar fell off owing to the decline in the nitrogen trade, the Leuna Works now



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CONTINUOUS REGENERATIVE COUNTERFLOW

use petroleum in addition to brown coal, especially the German oil which has recently been discovered in Thuringia. A far-reaching sales agreement has been effected by the I. G. Farbenindustrie with the largest German producer of petroleum, Burbach, A.-G., for its petroleum output. Not less than 16 pfennigs of the current price of 34 pfennigs for German benzine go to customs, and 2 pfennigs to taxes and other assessments.

"Technically, two steps are to be distinguished in the hydrogenation process: (1) the production of middle oils from heavy oils, or from coal or tar in the liquid phase (Sumpfphase); and (2) 'benzination' of the middle oils in the gas phase. In the hydrogenation of tar or petroleum, the material is first decomposed by distillation into benzine, middle oil, and heavy oil. The latter is brought under a pressure of about 200 atmospheres and mixed with hydrogen at the same pressure. The mixture is first heated in heat exchangers by the outgoing products, brought to the reaction temperature in heated pipes, and then introduced into the reaction oven. In the sump oven, by hydrogenation in the presence of a catalyst mostly middle hydrocarbons are formed, which pass as vapors, together with the unused hydrogen, to the heating coils where they are cooled by the incoming mixture. The vapors are liquefied in an attached condenser. Following the condenser is a trap in which the liquid hydrocarbons are separated from the hydrogen and small quantities of uncondensable hydrocarbons. The liquid products are separated by distillation into heavy and middle oils and benzine. The heavy oil goes back into the sump oven, the middle oil to the benzine oven in the second stage of the process, and the benzine fraction is ready for refining. The middle oil, which roughly corresponds with gas oil in its boiling range, is subjected to a pressure of 200 atmospheres with a pump and then united with hydrogen as in the first step.

"The mixture flows through the heating coils, in which the middle oil is completely vaporized, and into the reaction oven which is filled with the catalyst. Here under the influence of the catalyst the further splitting and addition of hydrogen takes place in the gas phase. From the benzine oven the reaction products pass by way of the heat exchanger and condenser into the liquid trap where the gas is separated from the condensed liquid. The liquid part passes to the distillation process. The liquid product contains about 60 per cent benzine, whereas the remainder is not converted and therefore separates in distillation and is led back

in the gaseous form. After a process of washing, the benzine is in marketable form. Hydrogen in excess of that necessary for the reaction is introduced in both steps. The uncondensed hydrocarbons and the hydrogen sulfide arising from the raw materials are removed from the hydrogen by washing under high pressure and the latter led back into the process with fresh hydrogen."

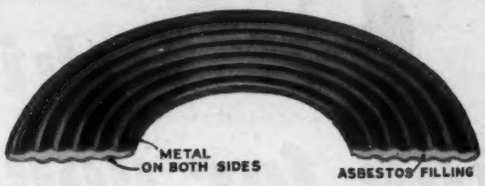
Natural Gasoline Production Costs Under The New Grading System

THE new method of grading natural gasoline was adopted for general use throughout the Mid-Continent, January 1, when the members of the Natural Gasoline Association of America dropped the former A, AA, B, BB and C specifications. The new specifications embrace a total of 24 grades. Coincident with the adoption of these grades the technical committee of the association released a paper in which an interesting discussion of the new grades and plant production costs was presented. A digest of the paper follows:

Although the complete economic effects of the new natural gasoline grading system can only be determined by actual use of the specifications in the channels of trade, the only uncertain factors in the equation are the ones bearing on demand in relation to grade. The supply factors have been rather thoroughly analyzed and can be simply stated.

The vapor pressure specification in the new grading system is the essential economic element. On this specification depend plant yields and the uses to which the product can be put. The sole effective function of the distillation specification is to provide a barrier against abnormal products or to provide a key to physical properties.

To properly understand the supply factors created by the new grading system, it should be stated clearly that each gasoline plant is definitely limited as to the number of grades it can produce under the new grading system. If a plant normally produces a 26-70 gasoline, it can not normally yield a 26-55 gasoline. If the demand is for 26-pound gasoline, this plant must sell in a market that required 70 per cent or more at 140. The vapor pressure of its product can not be lowered or raised without raising or lowering the per cent at 140. Very approximately, a decrease of one pound in vapor pressure is accompanied by a decrease of one per cent at 140.[1] In reducing the product of such a plant to the 22-pound



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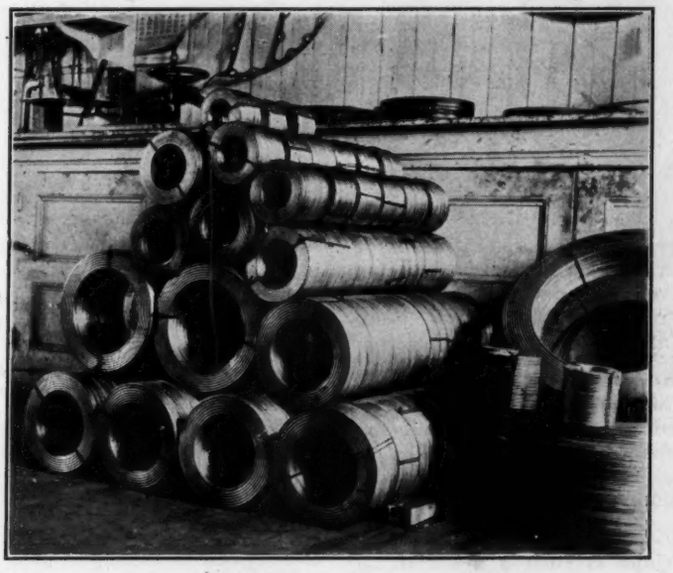

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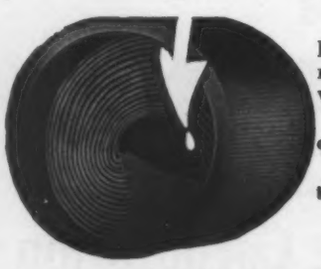
DURIMET

The Spiral Motion Is the Trick



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limit it may still maintain its position in the bracket for 70 per cent at 140 or it may be moved slightly within the 55 per cent at 140 bracket.

These basic distillation characteristics depend on the properties of the pentanes and heavier in the natural gasoline. Fortunately (in the interest of simplicity) the pentanes and heavier of some eighty to ninety per cent of natural gasoline is very much the same, at least in regard to distillation characteristics. It follows that the supply of natural gasoline in relation to the distillation characteristics is quite rigidly fixed.

It has been indicated[2] that the loss in yield due to reductions in vapor pressure is comparatively unaffected by the characteristics of the pentanes and heavier. The loss in passing from one vapor pressure limit of the new grading system to the next lower limit will be about 11 to 15 per cent, regardless of the distillation characteristics. This condition places all manufacturers on the same plane in regard to the vapor pressure specifications. There is no such flexibility or common basis in regard to the distillation characteristics. Consequently, the vapor pressure specification is the predominant economic factor as far as supply is concerned.

In the reference[2] cited a table was presented showing the price ratios to equalize gasoline plant income. This table was based on theoretical calculations entirely and is reproduced in part below. At one large plant a detailed and lengthy study of the actual plant yields in relation to vapor pressure of product has been made. It will be interesting to compare the results of this practical test with the earlier theoretical calculations. Such a comparison is presented in Table 1.

Table 1. Price Ratios Necessary to Equalize Gasoline Plant Income Under New Grading System.

Reid vapor pressure of product	Theoretical	Actual plant test 90 gravity raw gasoline
26	1.000	1.000
22	1.129	1.154
18	1.258	1.259
14	1.362	1.331
10	1.471	....

In view of the very good agreement of the operating test with theoretical predictions it can be assumed the ratios closely represent average conditions in efficiently operated plants. These ratios consequently afford a basis for determining relative cost of natural gasoline to the manufacturer.

In such a brief exposition as this, it is impossible to consider all the elements. For example, those desirabl

factors in anti-knock ratings not adequately defined by octane numbers, such as lead responsiveness and maintenance of anti-knock values are all in favor of natural gasoline. It has been fairly established that the plant yield basis for the new natural gasoline grading system is economically sound for both buyer and seller, and, if anything, the plant yield ratio basis favors the purchaser.

[1] G. G. Brown, Proceedings of the Tenth Annual Convention Natural Gasoline Association of America, May 20, 1931 (p. 43).

[2] R. C. Alden—"Some Comments on the New Grading System for Natural Gasoline," Proceedings of the Tenth Annual Convention, N.G.A.A. (p. 38).

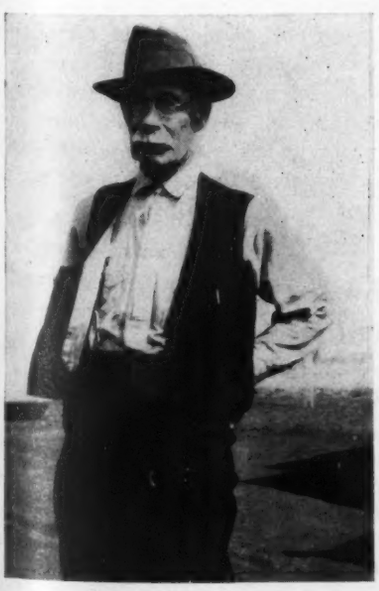
PERSONALS

Matt McCormick Has Wide Experience

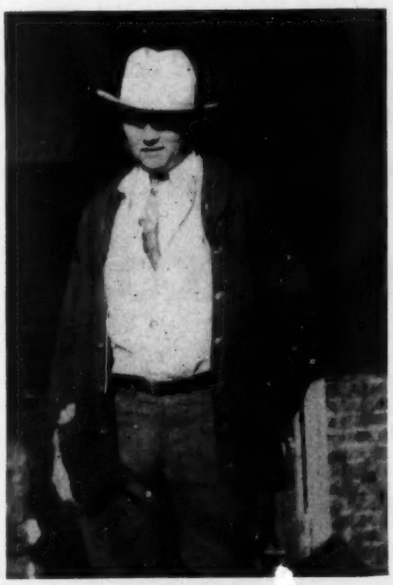
WHEN Matt McCormick recalled his first experience in the oil fields of Pennsylvania, he said it consisted of carrying a can of benzine home for his mother's lamps. The gasoline topped from the oil in the primitive refinery was dumped in the ravines and creeks near his home; it was considered a nuisance and of no value.

As he grew to manhood, the oil stayed in his system, so in 1882, California was in its first production, he went there as an employee of the Pacific Coast Oil Company near Newhall. He had charge of production in that field and during his 14 years employment with that company constructed the first casing-head gathering system to distribute the gas over the leases for fuel.

Fifty years is quite a span from casing-heads to casing heads, but Matt has stayed with the game, now having a casing-head gathering system of his own in a little pool producing from the Burgess sand about three miles west of Collinsville, Oklahoma, where until about the first of March he was content with making natural from the gas produced there. Now, he has been made over—forced into it as he said. The pipe line companies stopped taking the oil, so his gas supply ran low making it necessary for him to re-enter the refining end of the business. Running crude through his gasoline plant, taking the reduced crude as an absorption medium, he has relieved the distressed market there, making a bread and butter proposition for himself and the producers.



MATT MCCORMICK



V. T. LAINGER

Lainger Bosses Cracking for Kanotex

WHEN Iowa Park Producing & Refining Company had its Jenkins unit installed officials looked around for a man who was familiar with that particular cracking equipment to operate it for them.

V. T. Lainger, who had charge, as chief operator, of three Jenkins units at Arkansas City for the Kanotex people was induced to run the unit at Iowa Park. About the only thing he fusses about, is the length of time between the issues of *The* REFINER. He jumped all over the writer saying that he had not received as many issues as he thought he was entitled to receive. When the question was raised on the twenty-third of the month, he confessed and said that the last issue came to him about the seventeenth.

ED KIMES

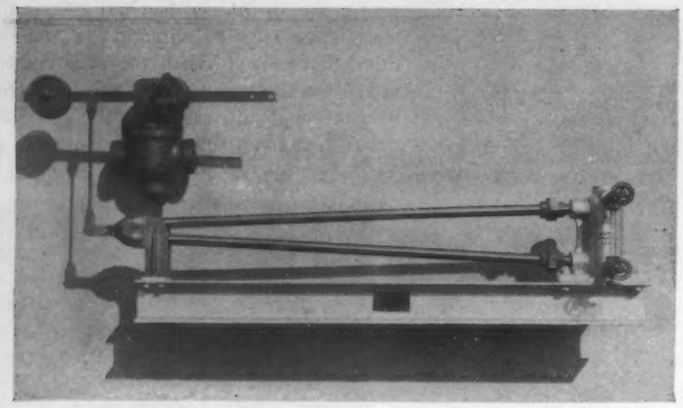
Kimes Superintends Root Refinery

ED KIMES, superintendent of Root Refining Company's Eldorado, Arkansas, plant has been in charge of operation since he supervised construction of the first installation back in the hey-day of the South Arkansas boom. He has enjoyed the experience of seeing his plant grow and expand throughout the years, adding first to the original distillation facilities, later two Dubbs cracking units, then a Root type cracking unit, and modern gasoline recovery equipment, to the end that the plant is now rated at 10,000 barrels daily capacity with 6000 barrels cracking capacity.

Before he became engaged in refining in southern Arkansas he gained several years experience in the north central refining district, one of his connections being with Red River Refining Company.

Zeppa Self-Made Refinery Executive

C. ZEPPA, superintendent for Arkansas Natural Gas Corporation in the Louann sector of the Smackover oil field believes that the more the average operator knows about his job, the easier it is for the superintendent to conduct his business. He says that some of the men



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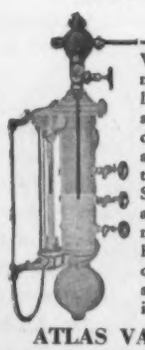

Why? Because the Campbell maintains a constant water level regardless of load. It slows down the feed on sudden load increase; quickly restores the water level when the steam demand decreases. Simple. Accurate. Dependable. Costs less to install and maintain than any other regulator. Any handy man who can cut and fit pipe can install it. Let us tell you what it is doing in other refineries.

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- ☐ Damper Regulators
- ☐ Temperature Regulators
- ☐ Pump Governors
- ☐ Float Valves
- ☐ Swing Joint Fittings
- ☐ Bronze Unions
- ☐ Thermostats
- ☐ Balanced Valves

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whom he has known are afraid for the employees working under them to know anything but just the mechanical operation of the plant. Just which valve to open after being told, and just which one to close, but not to use their heads for anything but to remember orders and a place to hang the hat. His attitude is that the more the individual in the plant knows, the more likely he will use his head for other things. Therefore, he insists that each man in his organization from the line walker up to the chief engineer read all that is available regarding the operation of a gasoline plant.

C. ZEPPA

Mr. Zeppa came from Italy when a small boy, in fact he was so small that he does not remember much about his native land; and to hear him tell it, he does not think much of it from hearing it described. His adopted country is a better place according to his ideas. Knowing next to nothing about the oil fields when he began working in them in the ditch, he applied himself to the job. Learning all that he could about those further up has resulted in promotion until he was given two plants to operate near Louann.

Losh Heads Road Oil Division

A. A. LOSH, formerly city manager of Oklahoma City, has been made manager of the asphalt and road oil division for Anderson-Pritchard Oil Corporation, Oklahoma City. Mr. Losh was formerly state highway engineer for Oklahoma, and prior to that, was with the U. S. Bureau of Public Roads as district engineer located at Fort Worth, Texas.

M. H. KOTZEBUE of Tulsa Boiler and Machinery Company, and Mrs. Kotzebue spent a two weeks honeymoon in San Antonio and other South Texas points and have returned to Tulsa. Mr. Kotzebue was married on December 5 to Miss Mildred Swain of Tulsa.

IN regard to the item "Mr. McDonald Goes to Canada" appearing on page 129 of Ref. & N.G.M. Dec. 1931, we are advised by Superintendent C. A. Hale of Canadian Oil Refineries, Ltd., that Mr. McDonald has not been transferred to Petrolia, Ontario, Canada.

J. J. LAUDERMILL, formerly chief chemist for Indian Refining Company (The Texas Company), Lawrenceville, Illinois, has moved to Louisville, Kentucky, where he is assistant superintendent at the plant of Louisville Refining Company.

PLANT ACTIVITIES

THE refining industry enters the new year with increased activity in general expansion and construction work underway in several of the refining districts. During the past month a number of important projects have been started and many others announced to the end that total current expenditure for general building in the industry totals around $10,000,000.

As is usual the large majority of new work is underway among the refineries, as compared to natural gasoline plants. However, there is considerable activity in natural gasoline plant construction in the East Texas field, as most of the companies interested in that area have decided to proceed with gasoline plant construction. Indications point to possible construction of around 20 such plants in the East Texas area.

Refinery construction and expansion programs now underway or proposed involve mostly the erection of additional cracking facilities. Current reports indicate that the gasoline reforming processes are to be utilized by a large number of refining companies, especially in those districts where antiknock value of straight run gasoline is relatively low. Other refiners are installing the usual type of heavy oil cracking processes while others are utilizing equipment designed for direct cracking of crude.

Additional work is planned in the modernization of lubricating oil manufacturing departments and grease plants. Gasoline recovery and stabilization units are again reported under construction for a number of companies and since many refineries have not enlarged or modernized their recovery departments the work of installation of this type of equipment will proceed during the coming months.

The growing popularity of motor fuels of high anti-knock value—which indicates a trend toward higher octane number gasoline extending even to the third grade—has brought about a condition where many refineries are out of balance in so far as skimming and cracking capacity is concerned. This condition necessitates construction of additional cracking units, both liquid and vapor phase, and further adoption of gasoline reforming facilities.

New Construction

Arkansas Fuel Oil Company, a Cities Service unit, is dismantling its absorption plants at Cartersville, Louisiana, and at Stephens and Louann, Arkansas, and moving them to East Texas, where they will be consolidated into an absorption plant to be located on Yount-Lee Oil Company's Smith lease, in the Castleberry Survey. The plant at Cartersville was a new plant installed in that field only a few months ago.

The East Texas unit, work on which has already started, will have a capacity of six to eight million cubic feet of gas daily and an output of approximately 2500 gallons daily. The gas will be drawn from a 4000-acre tract under 30 pounds working pressure.

A field gathering system of lines from two to 14-inch in size and totaling 32 miles will feed the new unit. The absorption plant will be equipped with a Southwestern Distillation unit and C. F. Braun stabilizer and will use Cooper-Bessemer engines.

Chaldron - Osage Oil Company is mentioned in reports as planning construction of a small skimming plant in the Osage Field, Wyoming, where the company has production.

Crosbie & Robinson, Inc., Tulsa, Oklahoma, has completed plans for the removal of an absorption type natural gasoline plant from the East Earlsboro pool Seminole area, Oklahoma, to the East Texas field, probably near Kilgore. The plant has a rated capacity of 20,000 gallons daily.

Garber Refining Company, Garber, Oklahoma, is installing a unit of the Lachman zinc Chloride continuous treating system (See description in Ref. & N. G. M., November, 1931, page 73). The Lachman process is handled by Winkler Koch Engineering Company.

Gulf Production Company has selected location for a pressure type casinghead gasoline plant in the East Texas field, and will proceed with construction work on it immediately, the project representing the first plant in the field for the company, although it is among the leaders in the area in ownership of producing and proven acreage.

The site on which the plant will be erected is a short distance southeast of Overton on the T. B. Cashen lease, Henry B. Dance Survey. Facilities will be afforded for handling from 3,000,000 to 5,000,000 cubic feet of gas daily. Gasoline which is recovered will be shipped out of the district in tank cars.

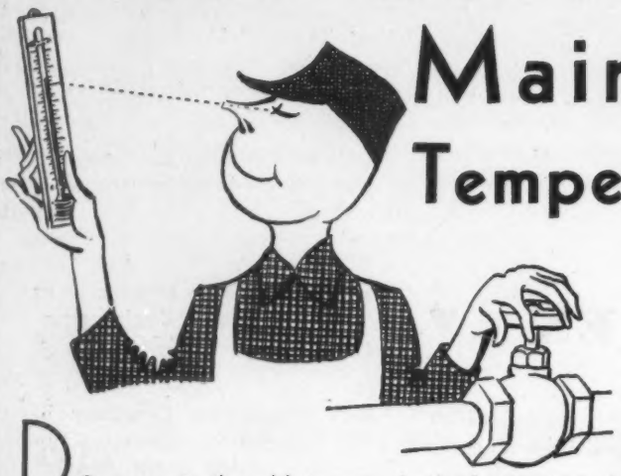
Although there have been reported instances in the East Texas field in which the gasoline recovery has ranged as high as five gallons or more, such return is considered exceptional, and ordinarily the yield is not over 2½ or three gallons of weathered gasoline per 1000 cubic feet of gas. (See Ref. & N. G. M., Dec. 1931, page 131.)

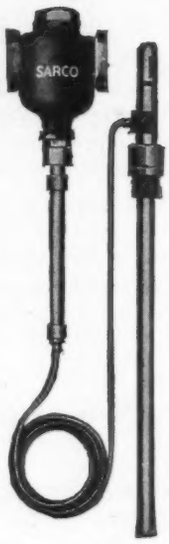
Kilgore Oil Company, headed by J. D. Wrather, according to newspaper reports has been negotiating for a refinery site at La Porte, Texas. The plant is to be similar to those operated by Amarillo Producers and Refiners Corporation (a Wrather company) in north and east Texas.

Oriental Oil Company, at its Dallas, Texas refinery is installing a new gasoline recovery plant for operation in conjunction with its recently completed cracking unit installed by Engineering Service Company.

Producers Oil Corporation, Bristow Oklahoma, is planning improvements and expansion to include installation of a new cracking unit. J. W. Koonce is superintendent.

How Do You Maintain Temperature ?





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Rio Oil & Refining Company, proposed construction of a 1000-barrel refinery at Rio Grande City, Texas, to use shallow crude production from a new field under development in Starr County, in which the company is interested.

Shell Petroleum Corporation at its Houston, Texas, plant is engaged in an expansion program involving construction of additional Dubbs cracking facilities. It is reported that the new equipment will be of the type charging crude direct to the cracking still, and that the work will include further expansion of other of the refinery departments.

Societe de Raffinage des Huiles de Petrole (Anglo-Persian) is reported to have taken lease from Societe Generale des Huiles de Petrole on the Courchelettes refinery, France, as well as the land at Martigues-Lavera (Mediterranean coast) where a new refinery will be erected with the technical assistance of Anglo-Persian Oil Company.

Standard Oil Company (Indiana) is progressing according to schedule with its improvement and modernization program at its Casper, Wyoming refinery. New type distillation facilities are being installed, including the addition of modern crackng units to replace obsolete equipment. A 6500-barrel Cross cracking unit unit is being erected by M. W. Kellogg Company using labor consisting of mostly company men formerly laid off. (Ref. & N. G. M., Nov., 1931, page 149.)

H. F. Wilcox Oil & Gas Company has announced that plans are under way involving construction of a new gasoline reforming unit at its Bristow, Oklahoma, refinery. The refinery is equipped with two modern cracking unit furnaces and it is reported that possibly one of these will be utilized for the proposed new unit.

Lukens Steel Company, Coatesville, Pennsylvania, has established in the Mellon Institute of Industrial Research a Fellowship whose purpose is the scientific investigation of processes employed in the manufacture of steel plates. Erle G. Hill, who received his professional education at the University of California, has been appointed to the incumbency of this fellowship. He is a specialist in iron and steel technology who was previously associate professor of metallurgy in the School of Mines of the University of Pittsburgh.

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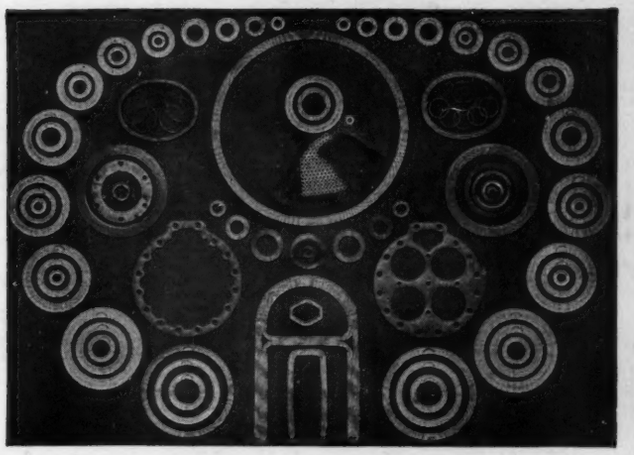

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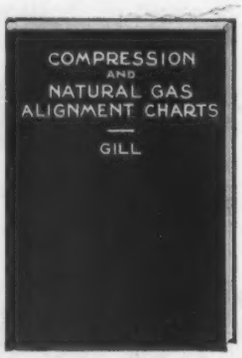

The charts in this book have been found useful in solving field problems arising in connection with the measurement, compression and transmission of natural gas, and in the manufacture of natural or casinghead gas. As many of the formulas in common use in natural gas operations are of an impirical nature, with constants that must be evaluated under varying conditions, it will be found that alignment charts are sufficiently accurate for nearly all purposes except for metering large quantities of gas, and here they serve as an excellent check on other calculations. Contains 41 charts, 65 problems. Price $3.50 Postpaid.

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▼ OPERATING ▼

Associated Oil Company and Mitsubishi Oil Company, Ltd., Tokyo, Japan, have completed construction of a 4000-barrel complete refinery on Tokyo Bay between Tokyo and Yokohama. (Ref. & N. G. M., Aug., 1930, page 145.) The plant, in addition to its crude capacity, has a 3000-barrel combination topping and cracking unit and a 1000-barrel lubricating oil plant. The plant was built under the supervision of Associated Oil Company engineers, by Mitsubishi Oil Company, Ltd., which concern was organized to carry on those operations by Associated Oil Company and Mitsubishi Goshi Kaisha, holding company for the Mitsubishi interests in Japan.

Coastal Petroleum Company will start operation of its new refinery at Mobile, Alabama, during the current month. The plant has a rated capacity of 5700 barrels per day. It is a combination crude topping and cracking installation. (Ref. & N. G. M., Oct., page 131.)

Officers of the company are, Victor H. Smith, president; W. E. McEwen, manager of sales; E. M. Coffey, in charge of construction and operation; and O. H. Berryman, assistant to Mr. Coffey. The plant was designed by J. P. Devine Manufacturing Company. East Texas crude will be processed.

Peterson - Woodruff's oil refinery, Harlingen, Texas, has been completed and placed in operation. The 1000-barrel skimming plant is owned by R. S. Peterson and Kenneth C. Woodruff and is operating on oil shipped in from Refugio.

Troy Oil Refinery, Troy, Spencer County, southern Illinois, has completed construction of a skimming plant rated at 300 barrels per day and is producing gasoline, kerosene, engine oil and fuel oil.

▼ CHANGES ▼

Atlantic, Pacific & Gulf Company (Orient Petroleum Company) with headquarters at Kansas City, Missouri, was placed in receivership December 28. The receivership was not opposed by company officials as it will enable the company to preserve its assets. Nelson E. Johnson was appointed receiver

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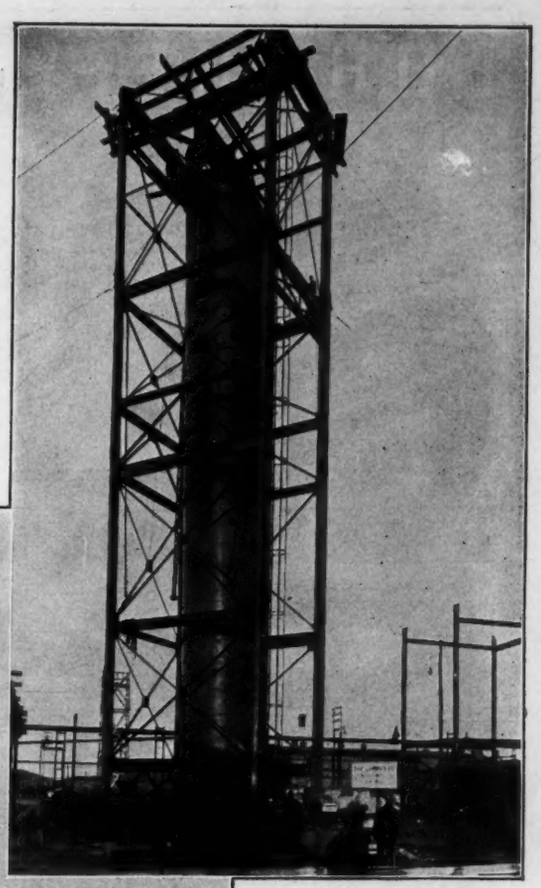
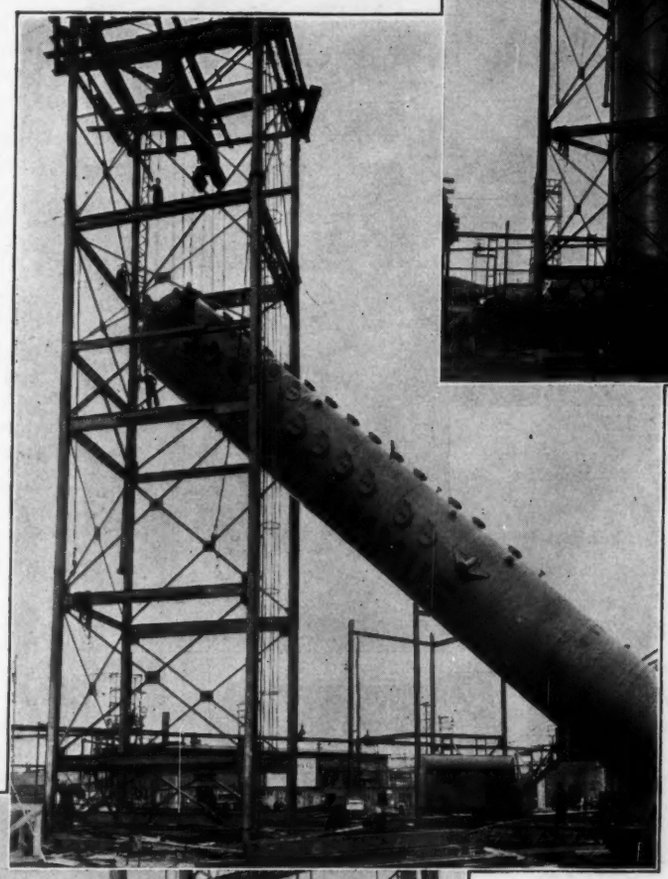
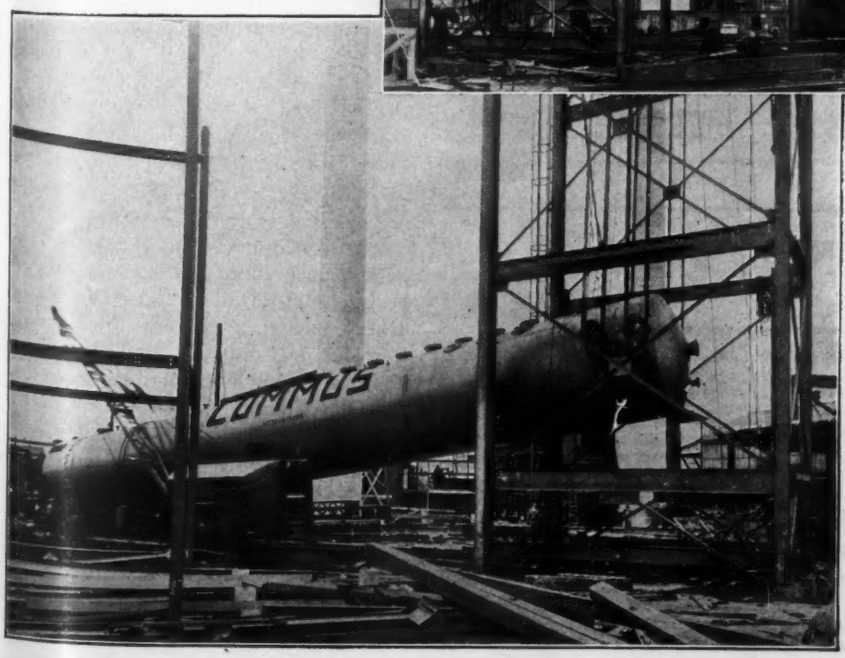




This bubble tower is twelve feet in diameter and over ninety-three feet long. The tower will operate under a pressure of 150 lbs. per square inch and temperature of 700 F. All the joints and seams of this tower were made by the Babcock & Wilcox fusion welding process and X-ray photographs to insure perfection.



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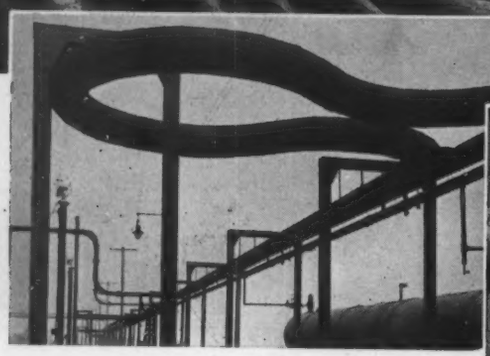

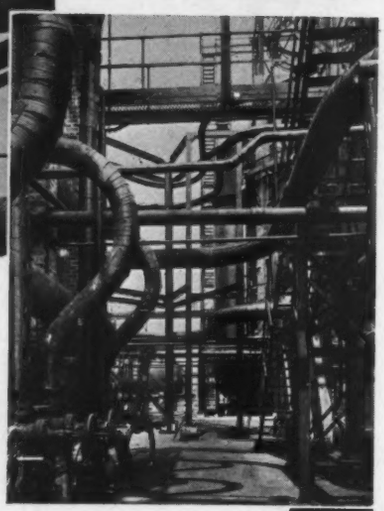

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and will continue operation of the properties. The company owns a 3000-barrel refinery located at Wichita Falls, Texas, and marketing outlets in Texas, Iowa, Illinois and Missouri.

Rio Grande Oil Company reported last month as operating in receivership in equity has avoided such action and the suit for receivership has been dismissed and the status of the company remains unchanged. (Ref. N. G. M., Dec. 1931, page 133.)

Sinclair Consolidated Oil Corporation, Prairie Oil and Gas Company and Prairie Pipe Line Company are proceding with merger plans but in denial of current reports as to final culmination of plans recently issued the following official statement:

"No statement respecting consolidation of our companies is authorized. Such an announcement for any authority must follow meetings of our boards, which meetings have not been held. As to the report that the headquarters of properties consolidated have been selected, this matter has not even been discussed. The question of the location of the general offices or any departments has not been determined, nor will such questions be considered until the consolidation is consummated and the organization of the new company, composed of the representatives of our several corporations, has had an opportunity to go into all the factors that would be involved."

Vacuum Oil Company, Incorporated, which has maintained offices in Houston for a number of years, will move the offices of the company to the Magnolia building, Dallas, on or about January 1, following consolidation of the production and land departments of Magnolia Petroleum Company and Vacuum Oil Company, a step called for in consummation of the merger between Standard Oil Company of New York and Vacuum Oil Company, effected July 31.

Producing, land, leasing, geological and engineering departments of Vacuum Oil Company at Houston, comprising a personnel of about 60, will be moved to Dallas, Lake Charles, or other operating centers of Magnolia Petroleum Company and lose their identity as such departments of Vacuum Oil Company.

Although no official announcement has been made to that effect, it is expected that a skeleton organization will remain in Houston to look after details of land and producing departments not already taken care of in the existing scope of Magnolia Petroleum Company's activities.

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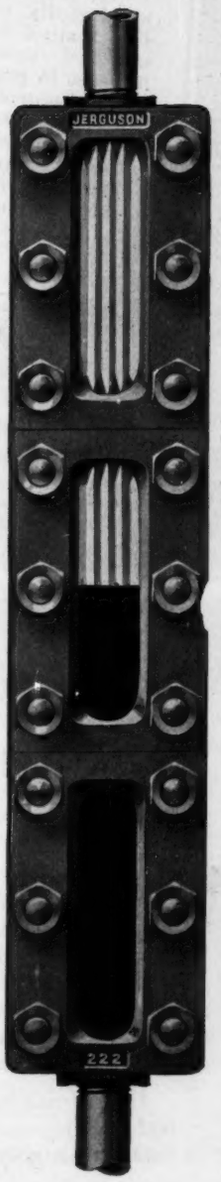

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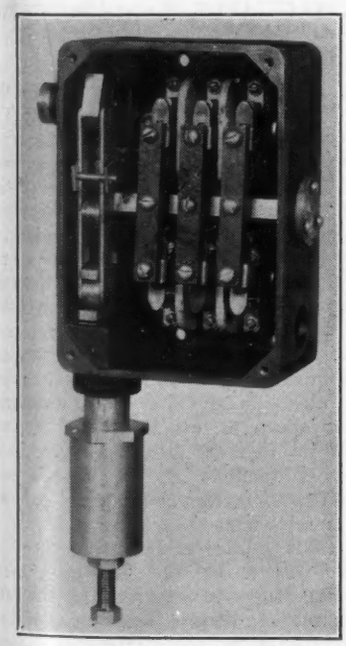
General Electric Company, Schenectady, New York, announces a new plunger type, snap action, weather proof limit switch, designed for general industrial applications, particularly adapted for foot operation, and which may be mounted in any position.

The switch has six separate electrical circuits, three normally open and three normally closed. Each contact arm in the switch may be removed by taking out a screw for easy access to the terminal studs for connecting the control lines.

It has a positive snap action, in either direction, and is operated by a cam and ball mechanism. The plunger is fitted with two main springs. The returning spring resets the switch in normal position when pressure is removed from the plunger while the overtravel spring compensates for any overtravel in excess of the half-inch required to operate the switch.

As pressure is applied to the plunger, the return spring compresses from a pressure of 26 pounds at 1⅞ inches in length to 45 pounds at 1⅜ inches in length where the switch snaps over. When pressure is removed from the spring plunger, this increased energy in the return spring snaps the switch mechanism back to normal position.



G-E Plunger-Type Limit Switch

The normal pressure of the overtravel spring is 50 pounds at 1⅞ inches in length. Consequently, this section will act as a solid member during the normal operation. However, in case the adjustment of the switch is not accurate, any overtravel up to one-half inch will be taken up by the overtravel spring. A round head set screw and lock nut is supplied as part of the overtravel member for adjusting the switch when installing it.

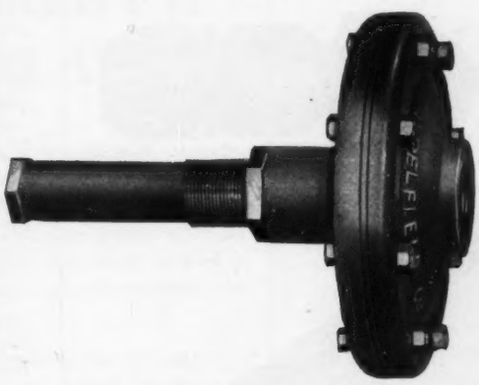
The switch is of rugged construction and is particularly adapted for rough duty installations. The enclosing case is of weather-proof, cast iron construction. An opening in the side of the case permits the connection of a one-inch conduit. All bearings are made of oil-less bearing material and consequently no lubrication is needed after installation.

Shock Absorber

H. BELFIELD COMPANY

H. Belfield Company, 435 North Broad Street, Philadelphia, with its western branch at 1509 Santa Fe Avenue, Los Angeles, announces the new Belfield shock absorber for relieving the strain in pipe lines and silencing water hammer.

This shock absorber is composed of two cast-iron plates between which is held a specially designed and constructed rubber diaphragm. This diaphragm is composed of vulcanized rubber with duck insertion and is molded to fit the two iron plates. Below the diaphragm and on the opposite side from the pressure are bronze triangular plates. These plates are supported at the center of the diaphragm and at the edge of the iron plates. These triangular plates are called "floppers" and they are the supports for the rubber diaphragm. With this construction the diaphragm is merely acting as a gasket.



Belfield Shock Absorber

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The manufacturers will furnish complete details on this new piece of equipment, upon request to the Los Angeles office, shown above.

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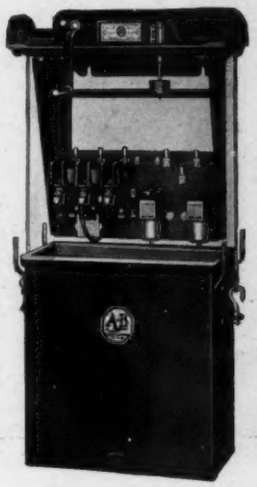
Allen-Bradley Company, 1311 South First Street, Milwaukee, has recently developed a line of explosion-proof across-the-line starting switches, of both the oil immersed and air brake type. These switches are used with squirrel-cage motors and slip-ring motors, on three-phase or two-phase three-wire systems, as well as self-starting single-phase motors, in



Allen-Bradley Switches

oil refineries, chemical plants, mines, and wherever inflammable gases or vapors are liable to be present. The maximum ratings are 25 horsepower at 110 volts, 50 horsepower at 220 volts, and 100 horsepower at 440-550 volts. When used with slip-ring motors, these switches are for primary control only.

The oil-immersed switches are available with ratings of 50, 100, and 150 amperes. The oil tank maintains at least a six-inch head of oil above the switch panel. In the 100 and 150 ampere switches, the tank is raised and lowered from a cast-iron head by two cable sheaves operated by a handle allowing one-man inspection. The tank of the 50 ampere switch is so light that sheaves are not provided. The heads are arranged for wall mounting and are equipped with oil-level indicators, as well as having tapped holes for conduit connections.

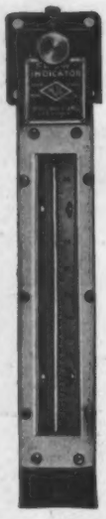
The air-brake type of switch is available only in the 50 ampere size. It is enclosed in a cast-iron cabinet with hinged cover, machined to obtain a tight fit without gaskets. The cabinet is cadmium plated to resist corrosion.

All switches have two magnetic overload relays, and the contactors are equipped with copper-to-copper rolling-type contacts as well as magnetic blowouts and arc shields. Many types of push-button stations and other accessories for explosion-proof service are available for use with the starters.

Accurate KNOWLEDGE

OF YOUR FLOW CONDITIONS

with the



MJL Flow Indicator

***Immediate,* accurate knowledge of process flow, *economically* obtained, is vitally necessary in all Refineries under present conditions. With the M. J. L. Flow Indicator you read flow of gases, water, oils, air, steam or chemicals *directly* in their proper units—no charts to figure . . . Cost much lower than recording meters.**

Close Hook up Type mounts directly on the flow line, handy to control valve. Operators appreciate the unique convenience of this type.

Remote Hook up Type permits mounting Indicator at any convenient distance from the pipe line—as in a meter house or operator's quarters.

Bulletin 208 tells *how* . . .

MJL

Send for *your* copy

MOREY & JONES, Ltd.

Manufacturing Engineers

924 So. Hemlock Street — Los Angeles, California

Motorpumps

INGERSOLL-RAND COMPANY

Ingersoll-Rand Company, 11 Broadway, New York City, announces a number of new sizes added to the Cameron line of small general service centrifugal motorpumps. These pumps are now made in one-inch discharge and upward.

Pump and motor are assembled as a single unit with a common shaft, producing a compact, lightweight pump which requires little floor space and can be easily installed. No foundation or baseplate is needed. The discharge nozzle may be turned to any one of four positions.

There are only two bearings. These are of the ball type and require lubrication but once a year. There is but one stuffing box, which is easily accessible. The impeller is made of bronze and is hydraulically balanced. Renewable bronze wearing rings and shaft sleeve are provided.

These pumps are used against moderate heads for a great variety of services, such as in circulation systems, air conditioning equipment, stand pipe and water supply systems, warehouses, etc.; condensate return systems; and general transfer service handling a wide variety of liquids.

The pump may be obtained in various motor combinations for all ordinary current conditions and for use in hazardous locations.

Detailed information may be obtained by writing to the manufacturer.

ROTO TUBE CLEANERS

built for Oil Still Tubes, 3″ I. D. *and up*

Roto Special 6-way Drill Head and Universal Joint.

Roto Air Driven Cleaner with Swing Frame Head attached.

Roto Combination Head and Universal Joint.

THE ROTO COMPANY

Sussex Avenue and Newark St., Newark, N. J.

Steam Trap

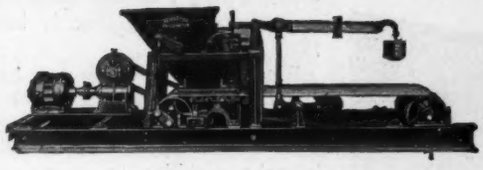
C. J. TAGLIABUE MANUFACTURING COMPANY

C. J. Tagliabue Manufacturing Company, Brooklyn, is now offering to the market a new and unique steam trap.

There are several outstanding features of this new steam trap, the company reports. The new and exclusive differential setting feature makes it possible for the Tag steam trap to discharge condensate at a temperature corresponding to a uniform differential pressure from 0 to 20 pounds below the operating steam pressure. If the trap is set to discharge condensate at a temperature corresponding to as much as 20 pounds less than the operating steam pressure, it will discharge the condensate at this differential regardless of whether the steam pressure is 50 pounds, 75 pounds, or 125 pounds, and without any further adjustment of the differential setting.

When the differential setting screw is all the way up on the Tag trap, there is no tension on the spring and the trap discharges condensate from one to two degrees below the temperature of the operating steam. When tension on the spring is applied, by turning down the setting screw, a mechanical pressure is created on the inside of the bronze bellows which aids the vapor pressure developed in the bellows to close the valve. Thus the amount of mechanical pressure exerted by the spring determines whether the trap will close at the temperature of

If You Treat Ten Thousand Barrels of Oil



The Automatic—Feeder Weigher—Conveyor

You use approximately 5 tons of Contact Clay at $20.00 making $100.00 per ten thousand barrels. Certain oils require one pound per barrel—others more, others less —Waste can be entirely eliminated by using a "Schaffer Poidometer" to automatically weigh—Proportion and feed your Contact Clay into the batch or process.

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For POWER PLANTS

National Airoil Burners are internal atomizing burners—inside mixers—operating with either steam or compressed air, and burn as steady as a gas flame with any grade of fuel oil. Set your fire the way you want it, and it will burn the day through without watching or readjusting.

No smoke—no carbon losses—no clogging. The oil is mixed with steam inside the burner before being fed into the furnace and cannot clog.

NATIONAL AIROIL BURNERS operate with an oil pressure of only 30 lbs. and an oil temperature of less than 150° F., an immense factor in plant safety.

NATIONAL AIROIL BURNER COMPANY
Oil Burners, Gas Burners and Furnace Equipment
Offices and Salesrooms: **1327 Girard Ave.**
Factory: **S. W. Cor. 9th & Thompson Sts., Philadelphia**

"SO WE LINED 'ER WITH STAINLESS"

A new still was needed. New stills were often needed until a certain refining engineer got the idea of spot-welding a lining of Stainless Steel to the interior. "There's a 'real film of protection'" he'll tell you. "It pays for itself many times over." There are many places in oil handling equipment where "Stainless" is an economic need—where your repair and replacement costs would more than pay for it in a short time. Why not have "Stainless"? Genuine Stainless Steel is manufactured only under the patents of American Stainless Steel Company, Commonwealth Building, Pittsburgh, Pa. Write for our new booklet . . . Today.

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TRADE MARK REG. U. S. PAT. OFF.
PRODUCTS

58% Soda Ash
Caustic Soda

Solid—Flake—Ground—Liquid

Leading refiners depend on these products for the quality and uniformity which industry inevitably associates with the name Solvay. First in pioneering the development of American sources of alkali, The Solvay Process Company is recognized as the outstanding leader of its field—first in size and first in facilities for rendering efficient service.
Strategically located distributing points ensure prompt delivery of Solvay products with minimum transportation charges.

Write today for prices and full information.

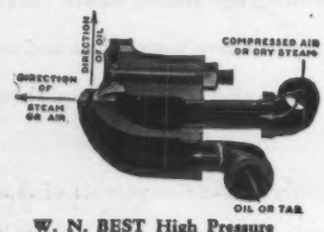
Solvay Sales Corporation

1881
50 Years of Solvay Leadership
1931

Alkalies and Chemical Products Manufactured by The Solvay Process Company

New York

61 Broadway



W. N. BEST High Pressure Oil Burner

W. N. BEST Oil Burners

are

dependable, efficient, economical, non-clogging atomizers of fuel oils, tars, acid sludges and still bottoms.

Write for catalogs.

W. N. BEST CORPORATION

Engineers and Manufacturers Since 1890

295 Fifth Avenue, New York City

the operating steam or five, 15 or 25 degrees below this temperature. And, in reverse effect, whether it will open to discharge condensate at one to two degrees below the operating temperature of the steam or at seven, 17, or 27 degrees below that temperature.

The trap has reversible, as well as renewable monel seats and discs, two for one in every Tag trap. By unscrewing and reversing the seat the outlet end becomes a new seat. By inverting the disc, the reverse, extra disc is brought into play.

The Tagliabue company has concentrated on one size, one-inch only, as the full five-sixteenths-inch valve opening gives ample capacity and permits of easy interchangeability on every steam line. Thus only one set of replacement parts is required for any application within the capacity of the Tag trap.

Aluminum Paint

ALUMINUM INDUSTRIES, INC.

Aluminum Industries, Inc., Cincinnati, has developed and has placed on the market Permite Resalum, an aluminum paint which the manufacturer claims forms a permanent aluminum protection for metal, wood, fabric, stone, or any combination of these materials.

Permite Resalum is said to "go farther" than paint. Regardless of the application, it is claimed by the manufacturer, it will go farther than any paint and will outperform any paint previously developed.

Characteristics claimed for this new painting material include: resistance to heat as shown by actual tests; resistance to corrosion when exposed to fumes, acids, and other like materials; resistance to weather and elements; to "dress up" and brighten interiors or to reflect light inside or outside; and as an economical paint in that each gallon is claimed by the manufacturer to cover nearly twice the surface covered by any other paint.

Further information on this new painting material may be secured by writing the company at the above address.

Threading Machine

OSTER MANUFACTURING CO.

Oster Manufacturing Company and Williams Tool Corporation, Cleveland, Ohio, have just announced the new Rotary Die Head "Tom Thumb," as a companion to their original "Tom Thumb" pipe and bolt machine, which was placed on the market last year.

The regular pipe capacity of the new machine includes all sizes from one-half to 1¼ inch with an extra capacity down to and including one-eighth inch. The regular bolt capacity is three-eighths to 1¼ inch with an extra capacity of one-quarter inch, five-sixteenths inch, 1⅜ inch and 1½ inch. It can be furnished either as a bolt threader or with special equipment to handle nipples.

CLEAN YOUR OIL

before barrelling or packaging. Remove the pipe line and tank accumulations, moisture and dirt by passing the finished oil through

SHRIVER BLOTTER PRESSES

They provide a most economical and efficient means for accomplishing this work not only for oils but gasolines as well.

Contacted oils when passed through SHRIVER BLOTTER PRESSES, are given a sparkling, bright, animated appearance.

Your inquiries are solicited.

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Established 1860
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A FILTER PRESS FOR EVERY PURPOSE

SHRIVER FILTER PRESSES

FILTER CLOTH . DIAPHRAGM PUMPS

FOR SOUTHWESTERN REFINERS

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Elgin Butler Brick Co., Austin, Texas

Athens Brick & Tile Co., Athens, Texas

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Texas Clay Products Co., Malakoff, Texas

A Quality Product

QUICKLY AVAILABLE AT LOW COST

Texas Fire Brick meet refractory requirements ordinarily expected of higher priced brick. Shipped to Southwestern points at an appreciable saving in freight. Time-saving short hauls from large stocks.

Write for prices.

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of the SOUTHWEST CLAY PRODUCTS INSTITUTE

ADDRESS ANY MEMBER LISTED

"Flexitallic"

Reg. U. S. Pat. Off.

Gaskets

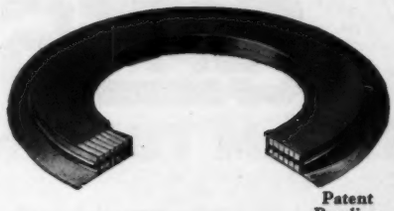
Condensation

adds needlessly to expense

by seeping into gaskets

causing follow-up, replacement and unnecessary shut-downs

..can NOT affect this FLEXITALLIC ARMOR CLAD!



Patent Pending

One of the exclusive features of each Flexitallic Armor Clad Gasket is a *sealed double-thickness of metal* where the Gasket comes in contact with vapors or fluids.

No matter how frequent or how severe your variations in load may be—no matter how much vapor condenses—Flexitallic Armor Clad Gaskets will hold, will add a factor of safety, will contribute to a reduction of maintenance costs.

Give Flexitallic Armor Clads a job to do . . . *they'll convince you!*

Flexitallic Armor Clad Gaskets are built to cope with severest conditions—pressure, acid, expansion and contraction, superheat, variable load, oil, corrosive vapor, vibration, condensation . . . The armor is made of the right metal for the job—stainless steel, monel, copper, whatever metal is required. The inside of the patented Armor Clad is a reinforced Flexitallic Gasket (also patented) made of alternate strips of metal and asbestos wound in a tight spiral, nineteen plies to the inch. Each metal strip is so shaped that it exerts a spring-like push against the squeeze thus giving Flexitallic resilience and flexibility. The spring-like character is retained, and the Gasket is not only faultless in service but reusable many times.

FLEXITALLIC GASKET COMPANY

8th and Bailey Sts. • Camden, N. J.

Eliminate Hazards

of electric motor drive~

install~

COPPUS

STEAM TURBINES

Gas and oil vapors present hazards which make the safe use of electrical equipment costly or impossible. Totally enclosed motors, vapor proof fittings, oil switches and compensators, all run into real money . . . and are subject to man failure which may at any time render the safeguards useless.

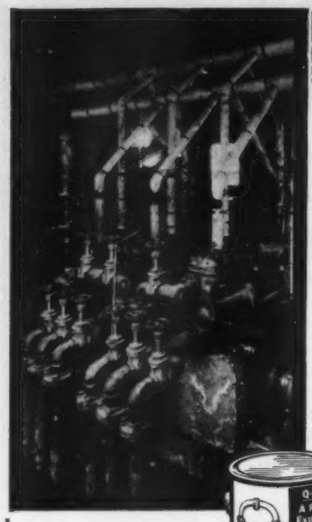
COPPUS Steam Turbines are safe under all conditions . . . first cost is comparable to that of electric motor of same rating . . . wide range of speed is obtainable at turn of a valve . . . efficient governor holds desired speed . . . correct thermodynamic design insures good steam economy.

Send for Bulletin 135-6

BLOWERS COPPUS TURBINES

Coppus Engineering Corporation

360 Park Avenue, WORCESTER, MASS.



All piping and flange joints made up with Q-SEAL

If you have a joint-sealing problem, consider–

*Q-SEAL

The Super Expansive Joint-Sealing Compound

"High-Pressure Steam, Oil, Acid, and Chemical-PROOF"

Q-SEAL positively makes joints *leakproof!* In every sense, it is a *super* joint-sealing compound—for high pressures, high temperatures, and wherever solvent or corrosive fluids and gases are conveyed in pipe lines and equipment.

Its unique advantages are the result of compounding an *inert, expansive mineral pigment* with an *inert, expansive vehicle,* impervious to steam, gas, oils, gasoline, kerosene, tar, creosote, acids, ammonia, brine, and other solvent or corrosive fluids and gases. *Double-expansion* (pigment and vehicle) ensures TIGHT JOINTS.

Q-SEAL is a natural lubricant and preserver of metal. It withstands high-pressures and temperatures, stays in uniform suspension, remains plastic, prevents "frozen joints," is unaffected by vibration, does not discolor materials conveyed in pipelines and does not spoil.

Q-SEAL has solved a great many difficult joint-sealing problems. We are entirely confident in recommending it for use in your plant.

Reasons: (1) *What it will do for you,*
(2) *Economy.*

Write for generous test sample and descriptive booklet R-8

*Pat. Pending
Reg. U. S. Pat. Off.

Use Q-SEAL

for making up screw-thread, flange, gasket and metal-to-metal joints in high pressure steam lines and pipe lines carrying hydrocarbons and chemicals; for sealing boiler hand-hole and man-hole gaskets, turbine casings, joints in pumps and valves, cracking still and other oil refinery equipment; for making up joints in oil burning and refrigeration equipment, and for sealing internal combustion engine head gaskets.

QUIGLEY COMPANY INC.

Manufacturers of Industrial Specialties

56 West 45th Street, New York

Distributors with Stocks and Service in Every Industrial Center

R-8

ITEMS ABOUT MANUFACTURERS

F. W. Anderson is in charge of all operations and sales for The Philip Carey Company in the Southwest, making headquarters at 417 Magnolia Building, Dallas, Texas. Under his direction three salesmen are serving the oil country, including R. T. MacEachern of the Oklahoma-Kansas territory; E. T. Kelley of the Gulf Coast territory, and C. R. Newcomb, in the North Texas area, handling pipe line felt, insulation materials, vapor tight tank tops and

F. W. Anderson

roofing. Anderson's connection with this company covers a period of more than 20 years, he having started in the home office at Lockland, (Cincinnati) Ohio. He was transferred to Florida, and later was given charge of the Kentucky territory, with headquarters in Louisville.

Brown Instrument Company has recently installed one of its new instrument boards, complete, in its Tulsa office in the Alexander Building for the purpose of demonstrating the working of the various instruments separately, or simultaneously. The board includes the trend analyzing furnace control, a recording pyrometer with multiple switch, potentiometer, flow meter and gauge clock, all mounted on Brown steel panels. Electric connection is made to the board from a regular wall socket.

The Arco Company, manufacturers of paints, varnishes, enamels, and lacquers, with general offices at Cleveland, announces the appointment of Philip L. Maury as president, S. D. Wise, president and Mr. S. D. Weil, vice-president, retiring. S. D. Wise entered the employ of the Arco Company in 1889 as office boy and within 12 years was president, which position he held up to the present time.

Philip L. Maury has had long experience in the paint industry. He formerly lived in Cleveland when he was connected with Sherwin-Williams Company, as manager of general industrial railway and marine sales. He left Cleveland to become vice-president and general sales manager of Detroit Graphite Company at Detroit, and continued in that capacity until the company merged with Valentine & Company when he became vice-president of that concern at New York. He resigned from Valentine & Company November 30, to take up his new duties with The Arco Company, December 1.

Weaver L. Marston, sales manager of Sharples Specialty Company, Twenty-third and Westmoreland Streets, Philadelphia, was one of the speakers before the Atlanta meeting of the N. E. L. A., on December 7 and 8. Mr. Marston spoke on "The Centrifugal Purification of Insulating Oils."

Foster D. Snell, Inc., 130 Clinton Street, Brooklyn, New York, announces the addition to its staff of Harry J. Hosking, who will do work in the company's research laboratory. He formerly served the staff of Roessler and Hasslacher Chemical Company at Niagara Falls, New York, a position which he recently resigned to go with Foster D. Snell, Inc. Foster D. Snell, Inc., also announces the appointment of W. C. Pinkerton as industrial representative. Pinkerton was formerly connected with International Exposition Company.

Webster Engineering Company of Tulsa, subsidiary of Surface Combustion Corporation of Toledo, Ohio, announces the appointment of Eldridge V. Weaver as sales engineer with headquarters at Chicago. Offices of Mr. Weaver will be in the Surface Combustion suite at 332 South Michigan Avenue, in Chicago.

Elridge V. Weaver

An engineer of wide experience, Mr. Weaver will handle sales and services of Wilgus regulators, Webster regenerative gas burners and Webster sludge and heavy oil burners. His addition to the Chicago offices is made to afford the company's increasing trade in the Middle West a closer sales and service contact.

J. A. Campbell Company, Long Beach California, will manufacture and sell the new Volz feed-water regulator, according to recent arrangements. G. W. Volz, engineer, has for the past 10 years been identified with the development of useful apparatus for steam plants. His most recent development is a radically improved type of boiler feed-water regulator, manufacture of which will begin immediately under the Campbell Banner.

It is the plan of the Campbell organization to effect distribution of the boiler feed-water regulator internationally, supplementing their other products—including "Oil-Froth" absorbers, Mist-D-Fiers, and other natural gasoline plant equipment. J. A. Campbell states that additional products are to be added to the line.

Electrically Driven Centrifuges
Hand Centrifuges
WRITE
WILLIAMS, BROWN & EARLE, Inc.
Manufacturers of Laboratory Apparatus
918 Chestnut St. Philadelphia, Pa.

Willis C. Brown has opened offices in the Oklahoma Natural Gas building, Tulsa, and will represent manufacturers of equipment, used in the refining and the natural gasoline industries. Among the manufacturers whose products he now has for the Mid-Continent territory, are A. W. Cash Company, Decatur, Illinois, makers of regulating and reducing valves; Armstrong Machine Works, Three Rivers, Michigan, manufacturers of Armstrong Bucket-type Traps; and

Willis C. Brown

Hobart Brothers Company, Troy, Ohio, makers of Hobart "Constant Arc" welding equipment.

Mr. Brown was for 10 years district manager of The Foxboro Company in the Mid-Continent territory. In 1928 he entered aviation work, in which he was engaged until recently.

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GRATING PRODUCTS

Square and Triangular Mesh
Floor Gratings and Stair Steps

The strongest and lightest
Bridge and Floor Slabs
(Monolithic)

Catalogue and Prices on request.

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Steel Flooring Company
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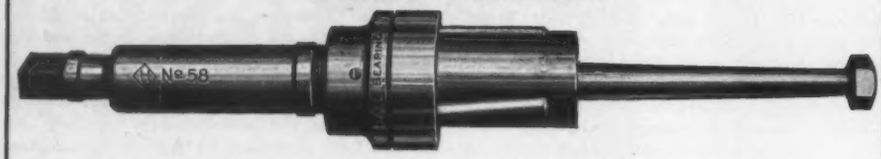
JERSEY CITY, N. J.
See Telephone book for Representatives

Heavy Duty Expanders for Still Tubes



Tools for the Oil Industries

Hydraulic Pressure Pumps, 8000 pounds
Tube Expanders for Cracking Still Tubes
Hydraulic Pressure Pumps, 2000 pounds
Tube Expanders for Condenser Tubes
Hydraulic Pressure Pumps, 500 pounds
Tube Expanders for Steam Boilers
Screw Punches for Structural Shapes
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Screw Punches for Plate Work
Flaring Tools for Still Tubes
Beading Tools for Still Tubes
Hydraulic Jacks
Hydraulic Punches

A. L. HENDERER'S SONS
Wilmington, Del.
Established 1870
Expanders since 1884

Hy-Speed
EXPLOSION-PROOF MIXERS

Hy-Speed Portable Electric Mixers are the most efficient machines manufactured for blending, compounding, mixing or agitating all oils and liquid chemicals.

They clamp to any tank or vat in one minute and produce a more thorough, rapid mix . . . . more economically than by any other process. Capacities from five to 50,000 gallons.

Write for your copy of «The Hy-Speed Age» ..... the Solution of your Mixing Problems.

For mixing
LUBRICATING OILS
LIME AND OIL
FULLER'S EARTH & OIL
ALL LIQUID CHEMICALS

ALSOP ENGINEERING COMPANY
47 West 63rd St.
New York City

Items About Manufacturers

C. B. Irish, vice-president of Leader Iron Works, Inc., and Leader Industries, Inc., has advised of certain changes in the duties and responsibilities of various members of the petroleum division of the company. Mr. Irish, who has been connected with the organization for more than 20 years, has for the past few years been supervising director of the activities of Leader in both the refinery and marketing phases of the industry.

C. F. Koenig

C. S. Whitman

C. B. Irish

W. F. Statham

W. F. Statham is in charge of engineering and design of refinery and natural gasoline plant equipment. "Bill's" friends and acquaintances will remember him through his previous connections with Empire, Pierce, Independent, Pan-American, Southwestern Engineering and Imperial Oil.

C. S. Whitman and C. F. Koenig are now devoting their full time to field engineering. Both Mr. Whitman and Mr. Koenig have been with the Leader organization for a considerable length of time. Both have a background of many years of practical and technical experience in the industry.

Mr. Whitman's previous connections, by which he will be best remembered, were with E. B. Badger & Sons, Kellog, Independent, Pierce, Sinclair and Transcontinental.

Mr. Koenig flew with the German air forces during the war and has since been connected with the petroleum industry in this country and in Brazil and Venezuela—serving with Shell, Standard and Southwestern Engineering.

The Pyrometer division of Wilson-Maeulen Company, Inc., has merged with The Foxboro Company. This action has followed 25 years of close and friendly cooperation between the two companies, and was made wholly in the interest of better service by thus being able to offer complete instrumentation to industry. Users of Wilson-Maeulen Pyrometers will be served by a larger, more wide-spread group of instrument engineers.

The entire personnel of the pyrometer division of Wilson-Maeulen Company will be merged with that of The Foxboro Company. This combining of the knowledge and experi-

Items About Manufacturers

ence of these two organizations will prove an important step.

Merger has a significance beyond that of greater facilities. The Wilson-Maeulen Company specializes in the manufacture of electric indicating, recording and controlling pyrometers and electric resistance thermometers for temperatures up to 3600° F. Thus, by including the outstanding Wilson-Maeulen temperature instruments, The Foxboro Company can now offer a complete range of instruments of standardized quality.

The Rockwell hardness tester that has been manufactured by Wilson-Maeulen Company will hereafter be built and sold by Wilson Mechanical Instrument Company which succeeds the mechanical instrument division of Wilson-Maeulen Company, Inc., and continues in the same factory and offices at 383 Concord Avenue, New York City.

Wilson-Maeulen pyrometers and controllers will be built in the modern factories at Foxboro. All communications relative to Pyrometers should be addressed to—Wilson-Maeulen Pyrometer Division, The Foxboro Company, Foxboro, Massachusetts.

Sharples Specialty Company, centrifugal engineers, through H. H. LaMont, vice-president, announces the appointment of Carl J. Lamb as New York district manager.

Lamb, a former naval officer, has been in the service, engineering and sales departments of Westinghouse Electric & Manufacturing Company until he resigned recently to join Sharples Specialty Company. Previous to his connection with the Westinghouse organization, he was in engineering work with E. I. DuPont de Nemours Company and Sinclair Consolidated Oil Corporation.

Tulsa Boiler & Machinery Company stockholders elected Charles W. Flint president and Stanley L. Spencer, secretary and treasurer early in November. M. H. Kotzebue was re-elected vice president. No changes in policy or activities are contemplated. The concern manufactures refinery and natural gasoline plant equipment in addition to contract work and jobbing various materials.

Homestead Valve Manufacturing Company, Coraopolis, Pennsylvania, has appointed Shaw-Palmer-Bakewell Company, 409 East Third Street, Los Angeles, as exclusive sales representatives in the Los Angeles district for the Hypressure Jenny, the spray cleaning machine manufactured by Homestead Valve Manufacturing Company.

Heat Transfer and Combustion Corporation, 7 East 42 Street, New York, has announced that the company is prepared to handle design, construction, and manufacture of complete oil refinery equipment. The equipment sold by this company will be made by Baldwin-Southwark Corporation, a division of The Baldwin Locomotive Works.

J. E. Christian, president of the company, is one of the outstanding designing engineers of the industry. He was formerly associated with Shell oil interests.

J. C. Moore, vice president, was long associated with Pan American oil interests as chief engineer. Dr. T. R. Rudolf, formerly of Tulane University, is an authority on distillation and treatment of oils. Other officials include: L. A. Clausell, secretary; Van Buren Harris, vice president; E. Whitfield, treasurer, and W. H. Johnson, comptroller.

NEW CATALOG on NEWARK Wire Cloth IN PREPARATION!

This Catalog will soon be superseded by our No. 32.

You will doubtless want us to send you a copy of the new catalog as soon as it is off the press. The coupon at the right, a letter, or a card, will bring your copy.

Every refiner should have a copy of No. 32. For instance it will be the only catalog in the world listing 400 mesh cloth—160,000 perfectly square openings per square inch. Stainless Steel Wire Cloth, first announced by us, is included. Etc. See coupon at right.

Every effort has been made to produce for our customers and prospective customers a publication that will be truly useful and educational. It will *not* be a gaudy, expensive, space consumer. Actually, it is a hand book on wire cloth. You can carry it around in your pocket. It will take up very little space on your desk or in your files. It will be handy and complete, containing concise information of value to both inexperienced and experienced users of wire cloth.

NEWARK WIRE CLOTH CO.

364-378 VERONA AVE. NEWARK, N. J.

West Coast Representatives: The Pacific Metals Co., Ltd., Los Angeles and San Francisco, Calif.

FILL IN, TEAR OFF, AND MAIL THIS COUPON

Newark Wire Cloth Co.,
364-378 Verona Ave.,
Newark, N. J.

☐ Yes, by all means, send me a copy of your new catalog No. 32 as soon as it is off the press. It is understood that I will not be obligated in the slightest. I am particularly interested in the following:

☐ The "Newark" Cornerless Testing Sieve —U. S.—A. S. T. M. Standard
☐ The finest wire cloth in the world—400 mesh — 160,000 square openings per sq. in.;
☐ "Newark" Metallic Filter Cloth;
☐ Gasketed Metallic Filter Cloth;
☐ Double Crimped Heavy Steel Wire Screen;
☐ Centrifugal Cloths;
☐ Plain Steel Wire Cloth;
☐ Stainless Steel Cloth;
☐ Monel Metal Cloth;
☐ Bran Duster Wire Cloth;
☐ Tinned Milled Screen Cloth;
☐ Brass, Copper and Bronze Cloth;
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CATALOGS . . . BULLETINS

Helpful Publications Which Manufacturers Will Be Glad to Send Free for the Asking

Pipe Tools

The Borden Company, Warren, Ohio, has issued Catalog No. 32, which in a condensed form offers the trade the very essential information on pipe tools. Illustrated descriptions of the various Beaver tools are given, with prices, sizes etc., carried in connection with these descriptions.

Diesels

Busch-Sulzer Bros.-Diesel Engine Company, St. Louis, has published a 48-page book titled "Advantages of the Diesel Ship." A section is devoted to fuel consumption, a section to sailing radius, a section to carrying capacity, a section to crew space and a general section. A copy of this booklet is available to oil company executives upon request to the St. Louis office.

Compressors

Fuller Company, Catasauqua, Pennsylvania, describes in Bulletin C-2 its compressors and vacuum pumps for capacities up to 1460 C.F.M. actual delivery and discharge pressures up to 140 pounds gauge. This bulletin, covering 12 pages and being fully illustrative of these compressors and pumps, is available upon request to the Catasauqua headquarters.

Transmission

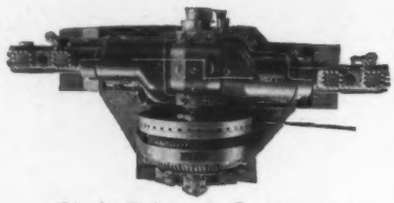
Reeves Pulley Company, Columbus, Indiana, has issued Catalog 99, entitled "Reeves Variable Speed Transmission," comprising 74 pages, which includes six parts as follows: Part 1, Construction and Operating Principle; Part 2, Designs, Remote Controls, and Accessories; Part 3, Automatic Speed Control; Part 4, Standard Equipment Application; Part 5, Specific Industrial Uses; and Part 6, Engineering Information.

The catalog is fully illustrated and in addition carries blue prints of all important equipment listed. It is fully indexed and carries as a supplement, List Price book No. 99a.

A copy of this catalog will be sent on request to the company at the above address.

Compressor

Clark Bros. Company, Olean, New York, announces a new bulletin No. 200-47, describing the balanced opposed compressor. This compressor has a two-throw 180° crank shaft so that the inertia forces cancel themselves at the crank pin, making a vibrationless compressor. A number of these machines are in operation in the Lake Maracaibo district mounted on piling in 30 feet of lake water where there must be no vibration.



Clark Balanced Compressor

These machines are especially adapted for vapor recovery service where a masonry fire-wall between the compressor and the motor is desired as a fire safeguard. Two of the 500 H.P. size are now being installed in a large eastern refinery.

Small Motors

Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, has recently issued a new 30-page bulletin entitled "Small Motors." The bulletin is divided into eight parts describing single-phase, polyphase, and direct-current motors in fractional-horsepower ratings. Wagner construction features are profusely illustrated and described in detail.

The new bulletin is known as No. 167, and is in loose-leaf form to permit keeping it up to date at all times. At present only five of the eight parts are available for distribution, but the missing three parts will be mailed at a later date to all those who request a copy of No. 167 at this time.

Cast Iron

Central Foundry Company, Graybar Building, 420 Lexington Avenue, New York City, has issued a six-page folder covering its universal dual-lok joint cast iron pipe and fittings, for manufactured and natural gas distribution, which will be mailed upon request. The cast iron pressure pipe, built for safety against leakage, is fully described and illustrated in this folder.

Bearings

Tyson Roller Bearing Corporation, Massillon, Ohio, has issued an engineering manual devoted to covering the Tyson cageless tapered roller bearings, a loose-leaf manual containing information which has required a long period of research and study. Each page in this manual represents a complete chart on a single series of Tyson cageless tapered roller bearings, including a dimension chart made from an engineering drawing of this particular bearing series, with two important tables.

One table gives capacities in pounds with the radial and thrust capacities at certain revolutions per minute. The second table on each series gives the cone number. Inserted in the manual is a six-page folder picturing and describing briefly the contribution of this company to the anti-friction bearing field.

A copy of this manual is available upon request to the company's Massillon, Ohio, headquarters.

Gears

General Electric Company's Schenectady office has recently mailed out a four-page folder covering G-E Textolite gears and gear blanks, carrying pictures, detailed descriptions, and a performance chart. The G-E Fabroil gears and gear blanks are described in a similar folder, and either piece of literature will be sent interested persons upon rquest.

Valves

Reading-Pratt & Cady Company, Bridgeport, Connecticut, gives a complete description of the new Lubrotite gate valve with its uses in a 16-page booklet recently issued. This valve differs from the ordinary gate valve in that it has a unique duct system for introducing a lubricant-seal between the seating surfaces. This results in tight seating even though the seats of the valve become injured in service, is to retard corrosion, and give easier valve operation.

Rotary Compressors

Vilter Manufacturing Company, Milwaukee, manufacturers of refrigeration equipment has ready for distribution bulletins Nos. 42 and 40 dealing with its line of rotary compressors with sleeve type rotors for ammonia compression, and the new Vilter "PakIce" machine, a new development in refrigeration perfected in the company's research laboratory and applicable to the removal of wax from lubricating oils. Copies of these bulletins can be secured from the company.

Steam Separators

Hagan Corporation, combustion and chemical engineers, 304 Ross Street, Pittsburgh, has recently mailed out Bulletin No. 100, a 12-page illustrated presentation of the Hagan three-stage centrifugal steam separators. Distinctive features and principles of operation of the separator are taken up fully, complete description of design and construction is given, and the need for this type of separator, with detailed operation are covered in this bulletin. The working of the separator is further carried in a pictorial layout.

COMPANY . . . . . .

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Please send to me, without obligation, free booklet described in the January issue of THE REFINER AND NATURAL GASOLINE MANUFACTURER.

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Gasoline Demand Necessitates Reduced Still Runs

By H. J. SHRUTH, *Staff Economist*

THAT refinery operations are being conducted at an excessive rate, despite reductions effected during recent weeks, is revealed by a projection of the demand for gasoline during 1932. Although prospective gasoline sales to domestic consumers are expected to show a moderate gain again this year, the facts at hand point definitely to the need for immediate curtailment of still runs. During the latter part of January, still runs were about nine per cent above normal for the industry as a whole, whereas some of the major refining districts revealed an excess of as much as 28 per cent above indicated normal. This is illustrated in the accompanying chart, showing the status of refining areas as of January 23.

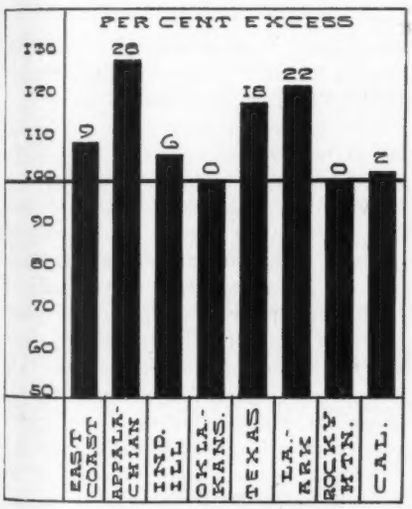


FIGURE 1

Status of Refining Operations, Showing Excess as of January 23, 1932

A survey of prospective gasoline requirements for 1932 indicates that the refiner can expect an increase in domestic consumption of perhaps eight-tenths of one per cent, while foreign sales will probably continue to decline, perhaps to the extent of 13 per cent under last year. The combined gasoline demand outlook points to a net decline under last year of about one per cent. This means that refiners will find it necessary to exercise greater control over their operations and will be obliged to reduce crude throughput by about 44,000,000 barrels under last year's total. In fact, by allowing for an increase in recovery and the normal quantity of natural gasoline and benzol required for blending, plus excess storage accumulation, this year's gasoline requirements can be produced from 850,000,000 barrels of crude. This compares with a throughput last year of 894,000,000 barrels.

Table 1 shows the status of the various major refining districts of the United States, as indicated by operations for the week ending January 23. This data furnished the basis for the accompanying chart and was compiled from facts revealed by a forecast of this year's demand. The daily average runs to stills for the period covered are based upon American Petroleum Institute figures, which have been corrected to a Bureau of Mines basis. It will be noted that the economic limit for January amounts to 2,033,000 barrels a day, whereas actual runs to stills for the week ending January 23 amounted to 2,220,545 barrels a day. On a volume basis, Texas refineries showed the greatest excess; 86,518 barrels a day above normal. On a percentage basis, the Appalachian district's operations exceeded normal by 28.2 per cent, while Louisiana-Arkansas and Texas operations denoted the necessity for reducing runs 22.1 per cent and 18.4 per cent, respectively. While there has been a definite downward trend in still runs in the opening weeks of this year, operations as of January 23, were still about nine per cent above normal.

A projected view of the probable demand for gasoline this year and the equivalent quantity of crude required by refineries is presented in Table 2. Domestic gasoline demand will probably amount to 406,175,000 barrels, as compared with 402,000,000 barrels last year. Exports will probably drop to a total of but 40,000,000 barrels, against approximately 46,000,000 barrels last year. It will be noted that the net quantity of gasoline required from refineries has been reduced by 6,000,000 barrels which represents the excess storage accumulation at the close of last year. The net quantity of gasoline to be produced by refineries this year should, therefore, not exceed 385,175,000 barrels, provided that imports of that product do not exceed 13,000,000 barrels. It is assumed that the yield of gasoline from crude will show a further moderate increase this year, to perhaps an average of 45.5 per cent, whereas last year's average proved to be slightly over 44 per cent. This calls for an equivalent crude throughput of 850,000,000 barrels or

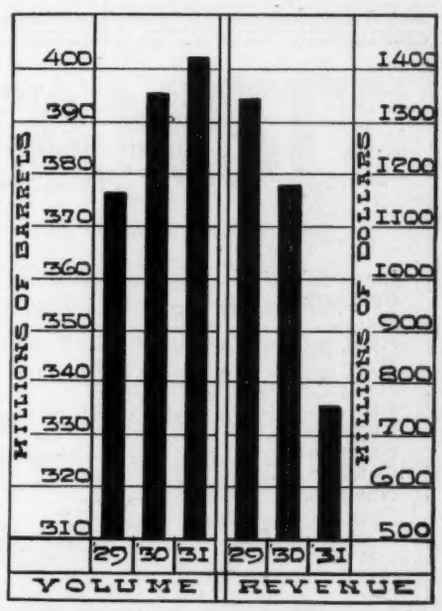


FIGURE 2

Domestic Gasoline Sales—Volume and Revenue

TABLE 1

Current Status of Refining Operations

District—	Economic Limit of Still Runs January (Daily Average)	Actual Runs January 23 (A.P.I. figures corrected to Bureau of Mines Basis)	Indicated Excess	Per Cent Excessive
East Coast	378,000	410,400	32,400	8.7
Appalachian	69,000	88,466	19,466	28.2
Indiana-Illinois	239,000	252,855	13,855	5.8
Oklahoma-Kansas	244,000	243,528	0	0
Texas	471,000	557,518	86,518	18.4
Louisiana-Arkansas	134,000	163,592	29,592	22.1
Rocky Mountain	46,000	45,000	0	0
California	452,000	459,186	7,186	1.6
Totals	2,033,000	2,220,545	187,545	9.2

a daily average for the year of 2,322,000 barrels.

Table 3 gives some idea of the probable course of gasoline consumption during 1932. Based upon predictions made by leading motor car manufacturers, it appears that motor vehicle registrations during 1932 will average about 26,245,000, whereas the average for last year was about 26,275,000. Last year, the average consumption of gasoline per motor vehicle registered, including all gasoline consumed in the United States, for all purposes, amounted to 643 gallons. Since the upward trend in average consumption will probably be continued this year, to a moderate degree, there is every reason to believe that the average consumption per motor vehicle will amount to about 650 gallons. On this basis, it is reasonable to conclude that the slight gain in domestic consumption is justified. Gasoline sales for 1932 will probably remain consistently below last year's sales, until next May, when expected improvement in buying and operation of motor vehicles will probably be witnessed. From then until the first of September, gasoline sales will perhaps be equivalent to those of last year. Beginning with September, resumption of automobile buying will probably have reached its stride for the year and increased registrations will perhaps result in considerably increased sales of gasoline to domestic consumers. The cumulative result for this year will probably not begin to show a gain over last year until toward the close of the year, when there is expected to be a resumption of the interrupted upward trend in motor vehicle registrations.

TABLE 2

1932 Gasoline and Crude Oil Demand

	Barrels
Domestic gasoline demand	406,175,000
Exports	40,000,000
Total demand	446,175,000
Less, natural gasoline and benzol	42,000,000
Less, imported gasoline	13,000,000
Net U. S. refinery gasoline	391,175,000
Less, excessive gasoline stocks	6,000,000
Net production required from crude	385,175,000
Crude required at 45.5 per cent	850,000,000
Daily average crude requirements	2,322,000

TABLE 3

Gasoline Demand Forecast—1932

(Thousands of Barrels)

	Indicated Domestic Demand	Probable Exports	Total Demand	Cumulative Demand
January	24,600	3,347	27,947	27,947
February	25,030	2,970	28,000	55,947
March	30,630	3,715	34,345	90,292
April	31,787	3,515	35,302	125,594
May	36,660	3,038	39,698	165,292
June	37,938	3,435	41,373	206,665
July	39,582	4,320	43,902	250,567
August	39,886	4,104	43,990	294,557
September	38,273	4,060	42,333	336,890
October	34,772	2,472	37,244	374,134
November	33,582	2,264	35,846	409,980
December	33,435	2,760	36,195	446,175
Total	406,175	40,000	446,175	.....

TABLE 4

Refinery Crude Requirements—1932

(Thousands of Barrels)

	Domestic Crude	Foreign Crude	Total	Daily Average
January	60,250	2,975	63,225	2,040
February	57,700	2,800	60,500	2,085
March	65,580	3,240	68,820	2,220
April	68,250	3,370	71,620	2,385
May	70,900	3,500	74,400	2,400
June	70,000	3,500	73,500	2,450
July	73,550	3,630	77,180	2,490
August	75,450	3,675	79,125	2,552
September	72,550	3,645	76,195	2,540
October	67,350	3,325	70,675	2,280
November	65,500	3,240	68,740	2,290
December	62,920	3,100	66,020	2,130
Total	810,000	40,000	850,000	2,322
Daily Average	2,213	109	2,322	....

Few industries have been so fortunate as to show a consistent gain in demand for the principal revenue-producing product, which in this case is gasoline. Yet, last year, the combined revenue from the sale of gasoline constituted a financial loss to the industry that made poor reading in the profit and loss account. Figure 2 depicts how the volume of gasoline sales has been consistently upward while revenue has shown a steady decline. Last year's total domestic gasoline sales showed a combined approximate revenue to the industry of $745,931,100, against $1,178,559,000 in 1930 and $1,340,183,000 in 1929, the most profitable period of its history. During this period, the trend of demand has shown a consistent increase, as indicated by the chart. The reason for this can be attributed mainly to failure of refiners to maintain their operations at the economic level dictated by the demand for gasoline. The result of uneconomic practices last year is too well known to invite further discussion here.

The lesson of last year should serve to discourage a repetition of the uneconomic practices which resulted in the lowest price levels in many years. With a fairly good outlook for this year, refiners will do well to heed the warnings being sounded by the present economic situation. Table 4 offers what appears to the writer as a normal course for this year's refinery operations. Whether the final outcome will agree with this course or not may

Your Surplus Refinery Gas Will Reduce Operating Costs

MODERN refineries operating cracking plants are producing a surplus of refinery gas. Some are reducing their operating costs by using TRANSIT Gas Engine Driven Hot Oil Pumps, because they operate most efficiently on the cheapest of all fuels, refinery gas. Others are investigating.

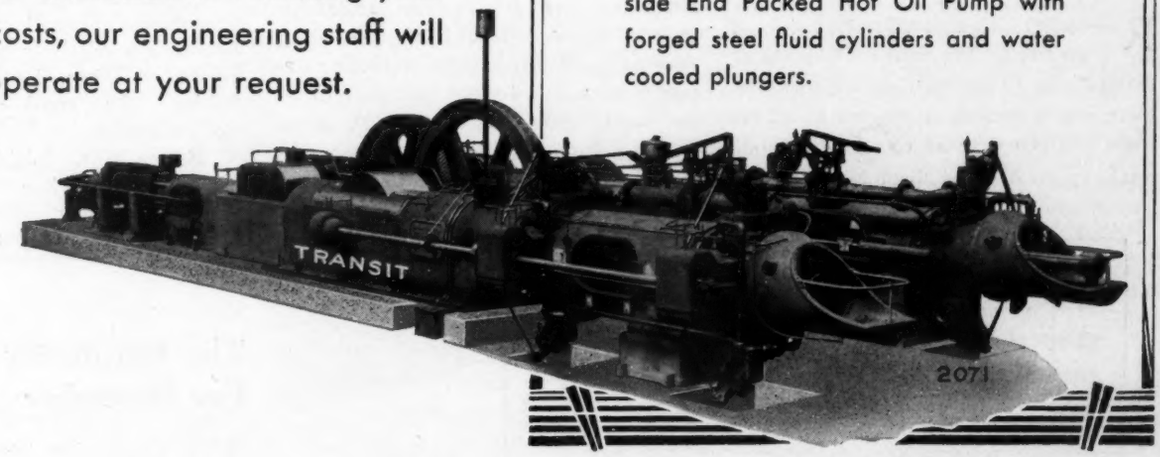
Where installations of this type are in daily operation, they have proved that they are the most efficient and economical hot oil pumping units.

If you are interested in reducing your operating costs, our engineering staff will gladly co-operate at your request.

This saving could never be more opportune than **NOW**

TRANSIT

17 x 24" Twin Tandem, Single Acting, Four Cycle, 300 H. P Gas Engine, Direct Connected and Back Geared to a 4-5/16 x 24" Horizontal Duplex Outside End Packed Hot Oil Pump with forged steel fluid cylinders and water cooled plungers.



BEAUMONT, TEXAS
E. L. Wilson Hardware Company

SALT LAKE CITY, UTAH
F. C. Richmond Machinery Co.

NATIONAL TRANSIT PUMP & MACHINE CO.
OIL CITY, PA.

PHOENIX, ARIZ.
Pratt-Gilbert Co.

LOS ANGELES
Republic Supply Company of California

ST. LOUIS, MO.
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FIELD PUMPS
TOOLS
for Pipe Line Construction
GAS ENGINES
GAS ENGINE GAS COMPRESSORS

NEW YORK PHILADELPHIA CLEVELAND PITTSBURGH LOS ANGELES HOUSTON TULSA NEW ORLEANS

TABLE 5
Still Run Quotas for February, 1932
(Barrels)

District—	Daily Limit Year 1932	Daily Limit February
East Coast	432,000	387,000
Appalachian	79,000	71,000
Indiana-Illinois . .	273,000	244,000
Oklahoma-Kansas	279,000	250,000
Texas	538,000	481,000
Louisiana-Arkansas	153,000	137,000
Mountain States ..	52,000	47,000
California	516,000	462,000
Totals	2,322,000	2,079,000

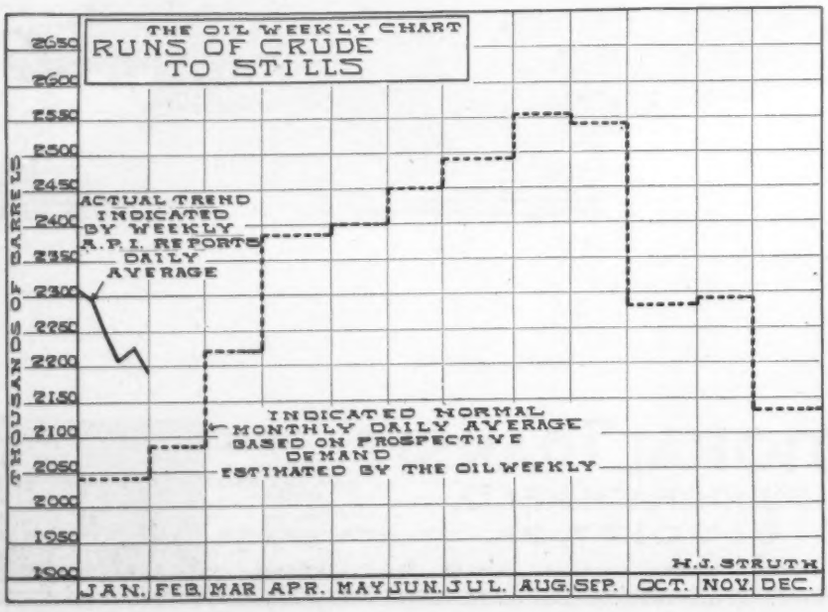
mean the difference between a profit and a loss. Whether this course will prove to be the ideal set-up for 1932 depends upon the actual course of gasoline demand. At any rate, it offers the industry a mark to shoot at—a mark that is closer to the financial bull's-eye than actual operations during January. That much has already been proven by the successive, unusually large additions to gasoline stocks.

Table 1 shows how much runs to stills exceeded the economic limit for January. Table 5 carries the economic limit forward to February for each major refining district, and presents a preliminary economic limit for each district for this year. Subsequent data will determine the corrected economic limits for each succeeding month. The indicated normal course of refinery still runs for 1932 is graphically portrayed on this page. This chart also shows the extent to which runs have already exceeded the economic limit for January. It is apparent, therefore, that the industry cannot afford to allow any increase in crude throughput and cannot expect any market improvement until runs have been reduced to the limits prescribed by the gasoline demand outlook. At the close of January, total daily average still runs were about 150,000 barrels a day above the economic limit for that month. The districts that have contributed to this excessive rate of throughput are shown by Table 1 and also by the chart, Figure 1.

ECONOMICS

Refined Exports Decline More Than Imports

REFINED oil exports for 1931 showed a greater decline than did imports or refined oils. Preliminary data shows that there was a decline in imports of all refined oils last year of 11 per cent, while total exports dropped about 26 per cent. A total of 98,969,000 barrels of refined oil products was exported, against a total for the preceding year of 132,794,000 barrels. Imports dropped to 38,832,000 barrels, against a total in the preceding year of 43,489,000 barrels. Gasoline exports showed a decline last year of 30 per cent, compared with 1930, while imports dropped about 20 per cent below the total imported in 1930.



Severe Competition From Russia and Roumania

THE oil industry's foreign trade has been subjected to severe competition from Russia and Roumania during 1931. Accompanying the sharp decline in the American oil industry's export business, has been a brisk increase in the export business done by Russia and Roumania. In fact, exports of gasoline from the United States to three principal European countries, England, France and Germany, showed a slump of nearly 7,000,000 barrels, combined, during the first 10 months of last year, while receipts of these countries from other sources increased to that extent. This volume of gasoline from the United States was displaced approximately as follows: Russia, 2,030,928 barrels; Roumania, 2,714,329 barrels; Persia, 1,226,045 barrels; Dutch West Indies, about 1,000,000 barrels.

Material Slump in Drilling Last Year

THE extent to which low oil prices affected oil field developments last year is shown by the fact that there was a decline in well completions of 41 per cent. Only 11,716 wells were completed in the United States last year, as compared with 19,848 in 1930. As a result of cessation of drilling in many fields of the country and feverish development of the highly-productive East Texas area, however, there was a relatively smaller number of dry holes. Thus, despite the slump in drilling, the number of productive wells completed only showed a decline of 38 per cent. Initial oil production rose sharply, when the rated daily potential of new wells aggregate 31,590,000 barrels, against 10,444,000 barrels in 1930.

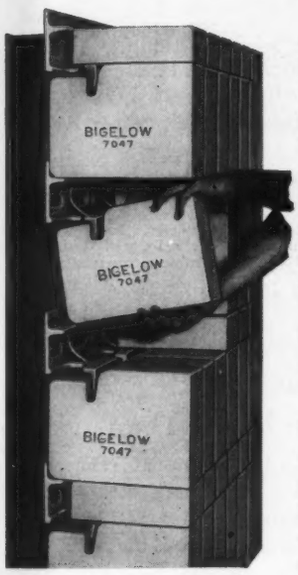
The Barometer For December

THE barometer for December, 1931, appearing on page 43 of this issue, makes a creditable showing for the producing branch of the industry, but a rather poor showing for the refining branch. The sharp decline in crude stocks, accompanied by lessened production, lower imports, greater exports and a comparatively better price relationship than is evidenced by the refining branch. It will be noted that the opposing factors to a better state of balance last year were practically all confined to the refined products

Why the majority of modern oil heaters have Bigelow Unit-Suspended Walls and Arches

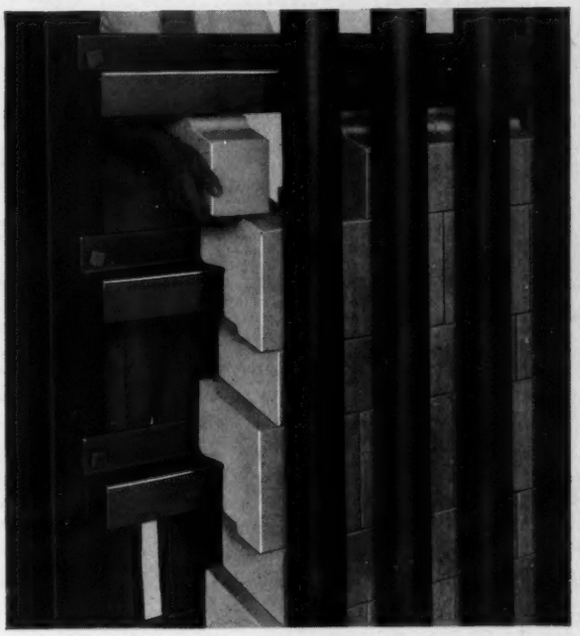
A brief study of the accompanying photographs will indicate why so many refiners have found it to their advantage to use Bigelow Unit-Suspended Walls and Arches on their oil heaters. Adaptability, low maintenance, long life, structural stability and construction economies are the characteristics of Bigelow Walls and Arches that have made them particularly suited to the needs of the modern refinery.

Additional information upon Bigelow-Liptak products will be found in the Composite Catalog of Oil Refinery and Natural Gasoline Plant Equipment. We shall also be glad to work with you in the solution of any furnace problem that you may have.



Photograph at left shows how easy and simple it is to remove and replace the wall blocks (only one refractory shape) and standard fire brick in the Bigelow Unit-Suspended Wall. Each block is independently supported and can be replaced without disturbing any other block; the refractory does not carry the wall load and there is complete compensation for expansion and contraction. There are no vertical joints over 8" long, thereby reducing the possibility of air infiltration or gas leakage.

Note how the brackets lock the blocks firmly in place and prevent bulging of the wall. The supporting steel is completely shielded from the heat of the furnace by a maximum effective thickness of refractory material.



The Bigelow Type LB Unit-Suspended Wall is used primarily in connection with tube banks where it is necessary to erect and maintain the wall from **outside** the setting. Note the unit suspension principle and the ease with which the individual wall blocks are removed and replaced from outside the furnace.

The upper block (sliding in from the rear) locks the entire refractory unit (consisting of one upper and one lower block) between two brackets. A zig-zag joint separates the adjoining double rows of refractory; this insures the slight expansion joint remaining tight. The vertical joints between blocks are also staggered. The sloping contact plane between upper and lower blocks and the resulting wedge action of the upper blocks make it impossible to pull the lower blocks toward the inside of the furnace. This is also impossible with the upper blocks because of their holding lugs at the top.

Note the uniformity of wall surface that is possible with the evenly formed dry press refractory shapes. Clearance between tubes and wall is therefore reduced to a minimum.

Slab or plastic insulation is easily applied to the rear of the Type LB Wall.

Bigelow Walls and Arches are in use on the following well known types of oil heaters:

Alco	**Holmes-Manley**
Badger	**Jenkins**
Cross	**Lientz**
De Florez	**McKee**
Dubbs	**Pratt**
Foster Wheeler	**Winkler-Koch**

And various other types developed by refiners for their own use.

Each "unit" of the Bigelow Arch is entirely independent of every other "unit." Erection of the Bigelow Unit-Suspended Arch from **outside** the furnace makes it particularly desirable where roof tubes are used. There is no cumulative loading of the refractory, and each "unit" is free to expand and contract without imposing stress on itself or adjacent "units," thereby eliminating the principal cause of spalling and greatly increasing the life of the arch.

The time usually necessary to cool down an oil heater for cleaning or repairs can be greatly reduced by quickly removing (from **outside** the furnace) several "units" from the Bigelow Arch to give the hot gasses this natural and rapid avenue of **escape.**

BIGELOW-LIPTAK CORP.

5053 Woodward Ave., Detroit, Michigan

Sales Offices in Principal Cities

Canadian Licensees: **Riley Engineering & Supply Co., Ltd., Toronto 10, Canada.** ***Main European Office:*** **Liptak Furnace Arches, Ltd., 38 Victoria Street, London, S. W. 1, England.**

BIGELOW-LIPTAK

A SUSPENDED WALL AND ARCH FOR EVERY FURNACE

Crude Runs to Stills, Gasoline Stocks and Gas and Fuel Oil Stocks

Report for Week Ending January 23, 1932

(Figures in barrels of 42 gallons)

District	Potential Cap. (Daily) Total	Potential Cap. (Daily) Reporting	Per Cent	Crude Runs to Stills Total	Crude Runs to Stills Daily Average	Crude Runs to Stills Per c't Operated	Gasoline Stocks (see note below)	Gas & FuelOil Stocks
East Coast	633,700	633,700	100.0	3,172,000	453,100	71.5	4,480,000	7,912,000
Applachian	149,600	137,400	91.8	618,000	88,300	64.3	1,330,000	1,601,000
Ind., Ill., Ky.	436,300	431,500	98.9	2,019,000	288,400	66.8	4,181,000	5,577,000
Okla., Kans., Mo.	485,700	435,200	89.6	1,422,000	203,200	46.7	3,505,000	4,365,000
Texas	838,200	765,400	91.3	3,937,000	562,400	73.5	7,573,000	11,873,000
Louisiana-Arkansas	233,100	230,500	98.9	1,224,000	174,900	75.0	1,262,000	4,070,000
Rocky Mountain	160,900	143,800	89.4	249,000	35,600	24.8	1,665,000	750,000
California	914,500	888,100	97.1	3,025,000	432,100	48.7	*13,203,000	96,393,000
Total January 23	3,852,000	3,665,600	95.2	14,995,000	2,142,100	58.4	39,738,000	129,921,000
Total January 16	3,852,000	3,665,600	95.2	14,874,000	2,124,900	58.0	*39,208,000	130,330,000
Total January 9	3,852,000	3,665,600	95.2	15,159,000	2,165,600	59.1	39,106,000	131,579,000
Total January 2	3,852,000	3,665,600	95.2	15,454,000	2,207,700	60.2	37,989,000	132,477,000
Total January 24, 1931	3,730,100	3,571,200	95.7	15,623,000	2,231,800	62.5	†40,365,000	132,052,000
The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.								
Texas Gulf Coast	532,500	531,500	99.8	2,810,000	401,400	75.5	6,637,000	7,987,000
Louisiana Gulf Coast	147,500	147,500	100.0	781,000	111,600	75.7	1,123,000	3,308,000

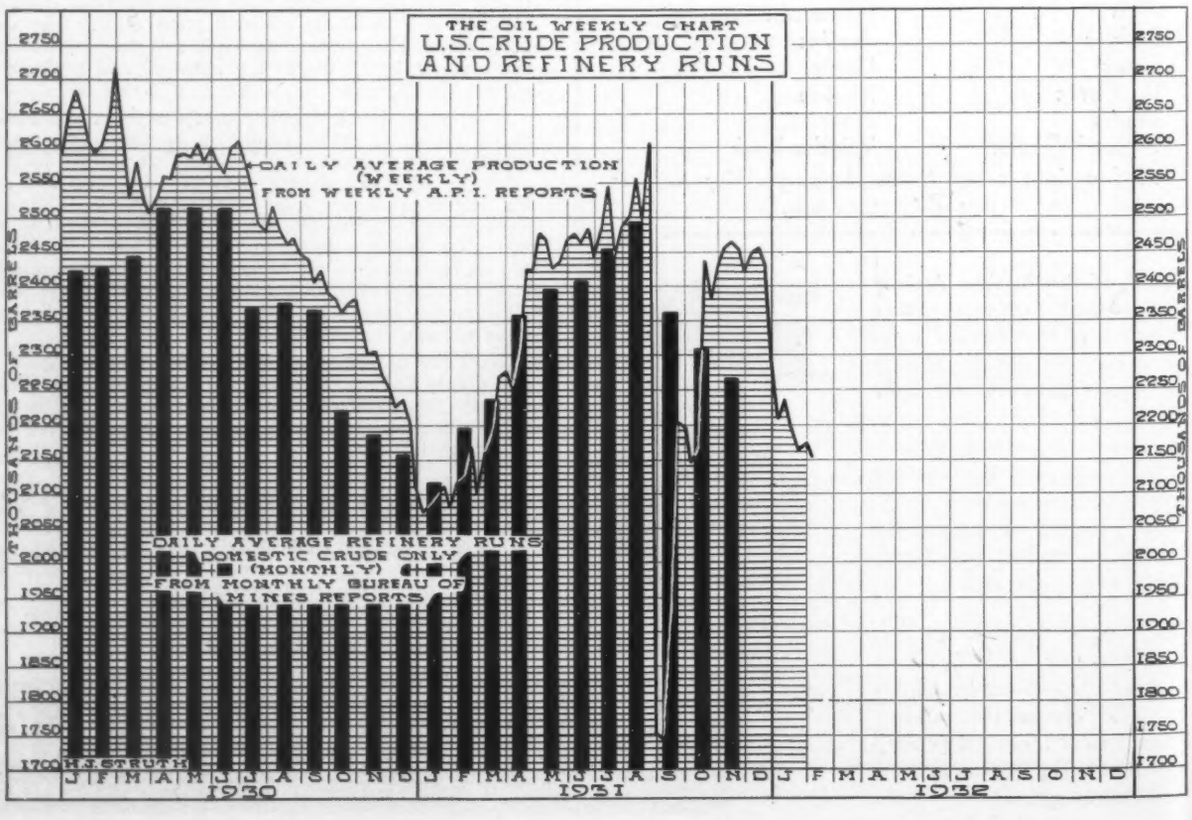
Note: In all the refining districts indicated except California, figures in this column represent gasoline stocks at refineries. In *California, they represent the total inventory of finished gasoline and engine distillate held by reporting companies wherever located within continental United States—(stocks at refineries, water terminals and all sales distributing stations, including products in transit thereto).

†Revised in Indiana-Illinois district, due to transfer to "Bulk Terminals" of stocks previously reported as "At Refineries."

situation. In contrast with the improvement shown in the crude oil situation is the increase recorded by gasoline stocks, the severe slump in gasoline exports, the relatively high rate of crude throughput and gasoline production and the severe decline in gasoline prices. Although there was some reduction in still runs last year, the fact remains that the rate of recovery increased to such an extent as to contribute to excessive production. The increase in domestic consumption of gasoline, amounting to two per cent over 1930 was a favorable factor that could have placed the industry in an enviable economic position had there been adequate control of the supply based upon predetermined knowledge of the export situation and the unrelented forward strides made in gasoline recovery by cracking.

Gasoline Stocks Increased Last Year

STOCKS of gasoline at refineries on December 31 amounted to 42,320,000 barrels, against 40,541,000 barrels on the same date of 1930. This represented a net increase for last year of 1,779,000 barrels. The increase in gasoline stocks indicates that production during 1931 was excessive to a considerable de-


THE OIL WEEKLY CHART
U.S. CRUDE PRODUCTION AND REFINERY RUNS
DAILY AVERAGE PRODUCTION (WEEKLY) FROM WEEKLY A.P.I. REPORTS
DAILY AVERAGE REFINERY RUNS DOMESTIC CRUDE ONLY (MONTHLY) FROM MONTHLY BUREAU OF MINES REPORTS
THOUSANDS OF BARRELS DAILY
H.J. STRUTH
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1930
1931
1932

Cracked Gasoline Production

Report for Week Ending January 23, 1932
(Barrels of 42 Gallons)

	Potential Charging Capacity			Production	
	Total	Daily Reporting	Per Cent	Total	Daily Average
East Coast	261,300	236,300	94.0	576,000	82,300
Appalachian	56,300	54,100	96.1	162,000	23,100
Ind., Ill., Ky.	330,400	315,400	95.5	483,000	69,000
Okla., Kans., Mo. ..	237,800	219,500	92.3	338,000	48,300
Texas	450,800	436,200	96.8	834,000	119,100
Louisiana-Arkansas .	112,400	112,400	100.0	184,000	26,300
Rocky Mountain ...	99,900	98,400	98.5	83,000	11,900
California	190,800	190,800	100.0	318,000	45,400
Total Jan. 23 1,739,700		1,663,100	95.6	2,978,000	425,400
Total Jan. 16 1,739,700		1,663,100	95.6	3,034,000	433,400
Total Jan. 9 1,739,700		1,663,100	95.6	3,098,000	442,600
Total Jan. 2 1,739,700		1,663,100	95.6	3,214,000	459,100
Total Jan. 24, 1931 1,589,600		1,378,200	86.7	2,573,000	367,600
The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.					
Texas Gulf Coast ..	352,400	347,400	98.6	676,000	96,600
La. Gulf Coast	77,000	77,000	100.0	125,000	17,900

gree, since the industry had a carry-over at the beginning of last year that was considered to be in excess of normal working requirements to the extent of more than 5,000,000 barrels. Excessive gasoline production last year is furthermore emphasized when it is realized that imports of gasoline were reduced during that period to the extent of more than 3,000,000 barrels. The severe drop in foreign gasoline sales saw a factor, however, in preventing a better state of balance between gasoline supply and demand.

Wholesale Gasoline Prices Down

AVERAGE wholesale prices of U. S. motor gasoline in Group Three slumped last year to the extent of 47 per cent below average prices received in 1930. The average refinery price of this class of motor fuel in 1931 was 3-1/3 cents a gallon, compared with an average of 6¼ cents in 1930. In the final month of last year, the price of U. S. motor gasoline averaged 2¾ cents a gallon, compared with an average of 4 cents in December, 1930. The price in December, 1931, represented a decline under the same month of 1930 of about 31 per cent.

Crude Production Down 47,000,000 Barrels

DECEMBER figures of the Bureau of Mines show that crude oil production of the United States amounted to 73,174,000 barrels, a daily average of 2,360,000 barrels. This indicates that total output of crude for 1931 amounted to about 850,275,000 barrels, or 47,736,000 barrels less than was produced in 1930. The daily average production for 1931 amounted to 2,329,000 barrels, against 2,460,000 barrels in 1930.

Bottled Gas Sales Increase

AN increase in the marketed production of liquefied petroleum gases during 1931, over the preceding year, is reported by the Bureau of Mines, on the basis of returns received from the principle marketing companies. Total sales of about 26,300,000 gallons are reported, which is an increase of approximately 8,000,000 gallons, over the 18,017,347 gallons marketed during 1930. Sales for 1930 were 8,087,000 gallons over sales for 1929.

Petroleum Refineries In Foreign Countries

THE Bureau of Foreign and Domestic Commerce, announces a revision of Trade Information Bulletin No. 784, "Petroleum Refineries in Foreign Countries, 1931," which contains valuable data regarding the number and ownership of petroleum refineries abroad, total output and production of individual plants, and methods of processing abroad, which will be of practical interest to all exporters of petroleum products as wel las to students of world affairs in petroleum.

The bureau reports that the number of foreign petroleum refineries has steadily increased in recent years, a development which has been accompanied by substantial improvement in refinery technology.

Copies may be had from the Superintendent of Documents or the Bureau of Foreign and Domestic Commerce, Washington, D. C.

Export Propane And Butane

SHELL Petroleum Corporation, Houston, loaded its first tanker shipment of liquefied petroleum gases late in January. The tanker Agnita of the Anglo-Saxon Petroleum Company's fleet, which has been specially fitted for handling liquefied propane and butane, is reported to have a capacity of 1250 tons for shipment of such products. The tanker, Captained by J. M. Van Hoen, is a small one and was constructed as an experimental ship, having a total deadweight capacity of 4770 tons.

Universal Makes New Royalty Rate

UNIVERSAL Oil Products Company has announced that effective February 1, a new royalty rate of five cents per barrel will apply for reforming gasoline through the Dubbs cracking units. In the past refiners reforming gasoline through this process have been paying the usual royalty rate of 15 cents per barrel, which applies to cracking gas oil and fuel oil. Reforming under the new royalty arrangement may be done in a separate unit designed for cracking low octane naphthas. Except in cases where refiners desire to fractionate a special distillate, they may charge crude direct to the latest type of Dubbs plant and crack the entire charge. Royalty rates are adjusted on this type of operation according to tests of the charging stock indicating the percentage boiling below 400°F. The owning company has perfected designs of the Dubbs cracking process which can crack crude oils, light oils, heavy oils or any other cracking stock with equal facility. Several units have been operating in the cracking of such light stocks as kerosene, straight run gasoline and heavy naphthas, securing high octane rating for the finished motor fuel and with low gas losses experienced in such operation.

N. P. A. at Cleveland April 21-22

THE semi-annual meeting of the National Petroleum Association will be held April 21 and 22 in the Cleveland Hotel, Cleveland, Ohio. Advices from the office off Fayette B. Dow, general counsel, are that an excellent program is being arranged. The fellowship supper will be held the evening of the first day. Important committee meetings will be held each day.

▼ ASSOCIATION ACTIVITIES ▼

Economics Featured At A. I. M. E. Meeting

ECONOMICS will have a prominent part on the program of the annual meeting of the Petroleum Division of the American Institute of Mining and Metallurgical Engineers, to be held in New York February 15 to 18, inclusive. Subjects of particular interest to refiners will be Economics of Domestic Marketing, by Sidney Swensrude, assistant to the president of Standard Oil Company of Ohio; Foreign Oil Supply and Demand, by E. B. Swanson, chief economist of the United States Bureau of Mines; The Petroleum Products Situation, by A. J. McIntosh, Standard Oil Company of New York; Economics of Refinery Operation, by Gustav Egloff, Universal Oil Products Company, and Economic Aspects of the Oil Situation by H. J. Struth, staff economist of THE REFINER. Mr. Struth is chairman of the economics section of the Petroleum Division of the A. I. M. E. and is scheduled to preside at the session on economics. Refinery Technology during 1931 will be discussed by H. W. Camp, general superintendent of Empire Oil & Refining Company.

Institute Mid-Year Meetings

THE American Petroleum Institutes Divisions of Production, refining and Marketing will hold their regular annual mid-year meetings simultaneously, this year on June 1, 2 and 3 in the Mayor Hotel, Tulsa. Plans for the programs of the three divisions are progressing rapidly. The tentative program calls for a general open session for discussion of pertinent problems of the industry and for general sessions of each division in addition to the regular divisional sessions at which technical papers will be presented and divisional routine business consummated. While the technical phase of the petroleum industry's work will be emphasized, the affair will in effect be a miniature annual meeting of the institute and will permit the institute membership to give consideration to questions that otherwise would be delayed until the thirteenth annual meeting at Houston next November 15, 16 and 17.

Arthur E. Pew, Sun Oil Company, has been appointed chairman of the program committee of the Division of Refining. Dr. R. P. Anderson is secretary. Members of the committee are: H. W. Camp, Empire Oil & Refining Company, Tulsa; T. G. Delbridge, Atlantic Refining Company, Philadelphia; R. T. Haslam, Standard Oil Development Company, New York; R. E. Haylett, Union Oil Company of California, Los Angeles; E. W. Isom, Sinclair Refining Company, New York; K. G. Mackenzie, The Texas Company, New York; Walter Miller, Continental Oil Company, Ponca City; L. W. Parsons, Tide Water Oil Company, Bayonne; J. B. Rather, Standard Oil Company of New York, Brooklyn; A. S. Russell, Standard Oil Company of California, San Francisco; F. W. L. Tydeman, Shell Petroleum Corporation, and R. E. Wilson, Standard Oil Company (Indiana), Chicago.

Fayette B. Dow, Vice President Pennsylvania Crude Association

THE Pennsylvania Grade Crude Oil Association, Oil City, has announced that Fayette B. Dow will serve as vice-president and general counsel, while Harvey Willson succeeds Rodney J. Alexander in charge of the association headquarters.

FAYETTE B. DOW

Mr. Dow, for several years, has been general counsel for the National Petroleum Association and counsel for the Western Petroleum Refiners Association. He is retaining both of those offices and will make Washington his headquarters, as heretofore.

Mr. Willson has been assistant secretary of the association for the past six months, having come from New York City, where he was assistant general manager of the Rubber Manufacturers Association for nine years, and subsequently publisher of a tire trade journal. His experience has been along lines closely related to the work of the Pennsylvania Grade Crude Oil Association.

R. J. Alexander, under whose secretaryship the association was founded and developed for eight years, resigned, effective January 1. He intends to take a long-deferred vacation before announcing his plans for the future.

Under the re-organization plan, the secretary's office in Oil City will continue to handle matters connected with the licensing of jobbers; brands; permit numbers; emblem regulations; oil analysis; field investigations and policing; advertising and publicity; and other routine, established activities. At his Washington office, Mr. Dow will give his attention principally to the financial affairs of the association and all major questions of association policy, including the underlying economic problems of the industry.

Gasoline Association Meeting May 17 to 19

THE Natural Gasoline Association of America has announced that its next annual meeting will be held at the Hotel Mayo, Tulsa, May 17, 18 and 19. The program committee is progressing in the development of a program for this convention. Membership of the committee is as follows:

A. T. Scherer of the Sinclair Oil & Gas Company as chairman; R. E. Baker, Shell Petroleum Corporation, Walter Moran, Crosbie & Moran, Inc., E. L. Stauffacher, Empire Oil & Refining Company; O. C. Field, O. C. Field Gasoline Corporation, and G. M. Campbell, the United Gas Public Service Corporation.

The Natural Gasoline Supply Men's Association will again furnish the entertainment for those in attendance at the convention. A. W. Burkett, Jackson Engineering Company, is chairman of the committee having charge of entertainment.

Oil Equipment and Engineering Exposition

A CHANGE in personnel has been announced for the Oil Equipment and Engineering Exposition which will hold its third annual from March 21 to 28, 1932, at Alameda Boulevard and 131st Street, Los Angeles. E. G. Lenzner, who was formerly general manager, is now the president and general manager of the organization. He was the originator and founder of the enterprise and put on the first show at the Shrine auditorium, 1930. During the following year he erected the present buildings at which the second annual Oil Equipment and Engineering Exposition was held.

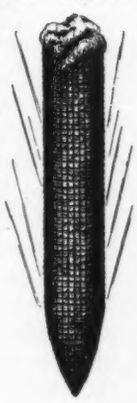
R. E. Zint is now vice-president and

For tanks and all metal surfaces

USE PURE LEAD PAINT

(Eagle Sublimed Blue Lead) for economical rust prevention . . .

Fight bottom water with Eagle Lead Wool



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Sublimed Blue Lead has had a remarkable success wherever it has been tried in the oil industry. It makes a pure lead, rust-preventive paint with very marked advantages. Quickly thinned to paint consistency, to meet the exact requirements of each job. May also be purchased in ready mixed form from reputable manufacturers. *Does not harden or liver in the container.* Grips metal surfaces tenaciously, preventing rust and corrosion. Indispensable for priming coat on all metal surfaces, as well as for the top coat. (Painters like it.) Has excellent covering power. Being pure lead, it is the most enduring paint. And its cost per square foot of surface protected is considerably less than other high quality metal paints.

Investigate Sublimed Blue Lead before planning your next metal-paint job. A postcard or letter will bring you a free copy of an interesting booklet "Rustproofing with Sublimed Blue Lead."

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One LIBERTY Cutter Head..

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The type "L" Liberty head is especially long, designed to hasten the tube cleaning operation and make a quick job of it. Equipped with the powerful Liberty motor, it is a great performer on the worst types of scale.

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LIBERTY CLEANERS for every kind and size of tube . . .

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sales manager. After graduating from Oakland City College in Indiana he came to California and took up post-graduate work in the University of Southern California. After that he taught for two years and then went with H. C. Smith Corporation where he was employed for seven years. At the time of leaving that organization he was secretary and sales manager and then went with Globe Oil Tool Company as sales manager. Before joining the exposition he held the same position with Crum Brainard Company.

Another addition is W. B. Summers who is secretary and business manager. He came to California from the University of Saskatchewan and held the office of secretary and treasurer of Lorraine Corporation for six years. Leaving that company in 1929 he entered the printing and publishing business in which he has been engaged for the last two years.

Gas Men At Tulsa

THE annual convention of the Natural Gas Department of the American Gas Association will be held at Tulsa, May 9, 10, 11. Plans for the program are now well under way.

S.A.E. Specifications for Free-Wheel Lubricants

AT a joint meeting held in Washington, January 22, the group representing the Society of Automotive Engineers, the American Petroleum Institute Committee on Testing Methods and Specifications, and Committee D-2 on Petroleum Products and Lubricants of the American Society for Testing Materials, considered specifications for free wheel lubricants and recommended modifications lessening the severity of restrictions. The Society of Automotive Engineers elected to publish the new specifications for information only until the next meeting in June at which time they may be adopted as S. A. E. Recommended Practice. The other two groups endorsed the proposed specifications, but it is not definitely decided that such specifications will be officially adopted this summer. Following are the specifications as endorsed at the Washington joint meeting:

No. 80 Free-Wheeling Transmission Lubricant for use in Temperatures Above—15°F.

The viscosity of this lubricant at 210°F. shall not be less than 42 seconds

Saybolt Universal. The viscosity of the lubricant at 100°F. shall not be greater than that given in the following table:

Maximum Viscosity at 100° F.	Viscosity at 210° F.
168	42
180	43
190	44
203	45
215	46
227	47
239	48
251	49
263	50
275	51

The lubricant must not channel in service at — 10°F.

No. 90 Free-Wheeling Transmission Lubricant for use in Teperatures above+15°F

The viscosity of this lubricant at 210°F. shall not be less than 74 seconds Saybolt Universal. The viscosity at 130°F. shall not be greater than that given in the following table:

Maximum Viscosity at 130° F.	Viscosity at 210° F.
345	74
355	76
370	78
380	80
390	82
400	84
415	86
425	88
440	90
450	92
460	94
470	96
485	98
495	100

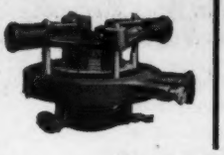
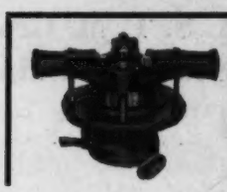
The lubricant must not channel in service at 0°F.

No. 110 Free-Wheeling Transmission Lubricant for use in Temperatures above+40°F.

The viscosity of this lubricant at 210°F. shall not be less than 140 seconds Saybolt Universal. The viscosity at 130°F. shall not be greater than that given in the following table:

Maximum Viscosity at 130° F.	Viscosity at 210° F.
1030	140
1100	150
1180	160
1250	170
1310	180
1360	190
1420	200
1480	210
1540	220
1590	230

The lubricant must not channel in service at + 10°F.

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Use a separate set of dies for each size pipe. Dies recede as thread is cut, assuring easy operation, and smooth, perfectly tapered threads. Oversize and undersize as well as standard threads may be produced as desired.

The "TOLEDO" No. 1 plain without ratchet sells for $9.60 ($10.20 west of Rockies). No. 1A with ratchet sells for $12.00 ($12.75 west of Rockies).

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R., 1-32

A. S. T. M. Group Meetings in March

THE standing committees of the American Society for Testing Materials will hold their annual spring group committee meetings in Cleveland, Ohio, beginning Monday, March 7, and extending through Friday, March 11. In conjunction with these is the third regional meeting sponsored by the society, which will be held Wednesday, March 9. Committee D-2 on Petroleum Products and Lubricants will carry forward its work on specifications and tests of products of this industry. The annual meeting of the A. S. T. M. will be held in Atlantic City, June 20-24.

N. P. A. Committee On Pour Tests:

THE committee, appointed by President Lyons of the National Petroleum Association, to suggest specific degrees of pour test as applied to neutrals and bright stocks suggested the following:

"Tolerance of tests in market quotations is not good, either for the buyer or the seller, and is misleading to both. Rather, it should be between the buyer and the seller on a specific trade. We recommend, therefore, that quotations on neutral oils be limited to those of the following degrees of pour test: Zero-10-15-25-30 and on bright stocks 10-15-25-35-45.

Metals Temperature Report Submitted

THE Joint Research Committee on the Effect of Temperature on the Properties of Metals, with representatives from the American Society for Testing Materials and the American Society of Mechanical Engineers has published the results of its symposium held in Chicago last June, in volume form for reference. The book is divided into two general sections, one dealing with engineering trends and requirements for metals at high and low temperature, and the other with the properties of available metals for high and low temperature service. Within the engineering fields covered by the symposium the 38 authors who prepared the papers have had the task of summarizing the information contained in the extensive literature, of appraising it critically and of adding unpublished information. A specially prepared introduction has been written which gives a brief history of the events leading up to the symposium and summarizes the more important points of the papers. A subject index and an author index and a bibliography of 600 annotated references is included. The book, published jointly by the American Society of Mechanical Engineers, 29 West 39th Street, New York, and the American Society for Testing Materials, 1315 Spruce Street, Philadelphia, is available from the address of either society at a cost of $6.00 for single copies.

Mapes Chairman Petroleum Section

THE Mid-Continent section of the American Institute of Mining & Metallurgical Engineers held its annual meeting at Tulsa Monday, January 18, at which time it elected Clarel B. Mapes, technologist and assistant secretary of Mid-Coninent Oil & Gas Association, as chairman for 1932. Other officers for the new year are C. C. Rae, production engineer for Skelly Oil Company, first vice chairman; Harry H. Wright, production engineer for Gypsy Oil Company, second vice chairman; and I. W. Alchorn, Oil Well Supply Company, secretary-treasurer. Members of the executive committee comprise the new officers, Harry F. Wright, consulting engineer and retiring chairman; L. A. Ogden, production engineer, Empire Companies; and Raymond Carr, production engineer, Sinclair Oil & Gas Company.

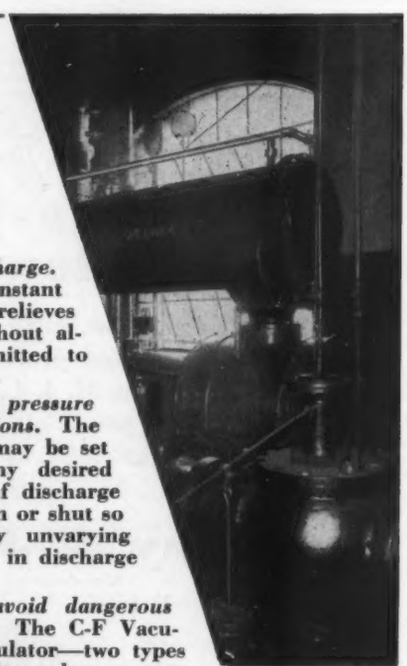
Joint Committee on Pressure Vessels

THE American Petroleum Institute and the American Society of Mechanical Engineers have organized a joint committee for the purpose of developing a code of good practice on the design and construction of unfired pressure vessels for flammable fluids. Walter Samans, Atlantic Refining Company is chairman and R. P. Anderson, American Petroleum Institute is secretary. The following are members of the committee:

American Petroleum Institute—A. J. Ely, Standard Oil Development Company, Elizabeth, New Jersey; E. V. King, Standard Oil Company of California, San Francisco; R. E. Ost, Gulf Refining Company, Pittsburgh; R. C. Powell, The Texas Company, New York; and Mr. Samans.

American Society of Mechanical Engineers—R. E. Cecil, Air Tight Steel Tank Company, Pittsburgh; E. R. Fish, The Hartford Steam Boiler Inspection & Insurance Company, Hartford, Conn; D. S. Jacobus, The Babcock and Wilcox Company, New York; James Partington, American Locomotive Company, New York; and Richard Stresau, A. O. Smith Corporation, Milwaukee.

A Compressor Needs to be Regulated



1. *To prevent excess pressure at discharge.* **The C-F Compressor Regulator for Constant Speed Pumps assures against this. It relieves any excess pressure at the discharge without allowing noticeable variation to be transmitted to the line beyond. Thoroughly dependable.**

2. *To maintain constant pressure under varying load conditions.* **The C-F Throttling Regulator may be set to load or unload at any desired weight. Slight changes of discharge pressure cause valve to open or shut so as to maintain practically unvarying pressure in discharge main.**

3. *To avoid dangerous vacuum.* **The C-F Vacuum Regulator—two types—will close when vacuum rises to the point fixed as the desired maximum. Accurate, sensitive, sure.**

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FULTON REGULATORS

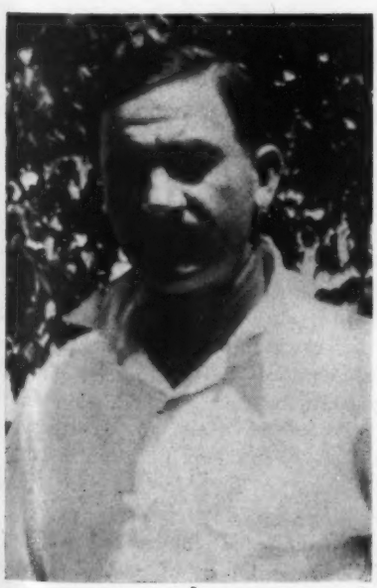
PERSONALS

Paulus Made Director Indiana Standard

DR. MAX G. PAULUS has been elected a director of Standard Oil Company (Indiana). He takes the place left vacant by the death last July of Dr. Gentry Cash. Dr. Paulus came to the Standard Oil Company (Indiana) in 1915 as a research chemist. After four years in laboratory work he served in executive positions at the Whiting refinery. In 1921 he was transferred to Casper, Wyoming, where he became manager of the Rocky Mountain division plants in 1927. In June 1931 he was promoted to the post of assistant general manager of manufacturing and transferred to Chicago. A few months later he succeeded Dr. Cash as general manager of manufacturing, a position he will continue as a member of the board.

Matthews Started in Pipe Line Department

H. B. MATHEWS, superintendent of the Medicine Lodge gasoline plant of the Kansas Gas & Gasoline Company, started in the petroleum industry as a "pipe-liner," later branching out in the business of producing gasoline from natural gas. Among other things falling under the supervision of the gasoline plant superintendent is the task of looking after several miles of telephone line. This one extends most of the way, along the highways, and Mathews, being both an electrician and a hunter, finds looking after the line a lark for it provides opportunity for shooting jack-rabbits and an occasional coyote. These "larks" arouse no envy when wintry winds, snow and sleet necessitate line repairs. Mathew's plant was described in this magazine, in the December 1931 issue, page 112.



H. B. MATTHEWS

Fales President New York Standard

FREDERICK S. FALES was elected president of Standard Oil Company of New York, late in January. He succeeds Charles F. Meyer who retired as president recently, but remains as a director of the company. Mr. Fales joined Standard Oil Company of New York in 1903, beginning in the manufacturing department of the company, where he remained until 1919 when he was elected to the directorate of the company and to the presidency of the Standard Transportation Corporation.

Bullard, Vice President Stanolind Oil & Gas

EDGAR F. BULLARD who has been chief geologist and director in charge of exploration for Stanolind Oil & Gas Company, Tulsa, Oklahoma, has been made vice president of the company. At the same time, F. J. Keleher, recently made secretary and treasurer, was elected to the directorate.

Executive Personnel Consolidated Oil Corporation

H. F. SINCLAIR is to be chairman of the board of Consolidated Oil Corporation, formed as the consequence of the Sinclair-Prairie merger. H. R. Gallagher, formerly vice president of Shell Oil Company (California) will be president of the new consolidation. W. S. Fitzpatrick is vice president of the executive committee, E. W. Sinclair is chairman of the finance committee. The directorate was announced as follows:

P. D. C. Ball, F. H. Bartlett, J. W. Carnes, Sheldon Clark, R. L. Clarkson, C. E. Crawley, Arthur W. Cutten, J. Fletcher Farrell, W. S. Fitzpatrick, Clark H. Kountz, Samuel L. Fuller, Dana H. Kelsey, George McDonald, Nelson K. Moody, William H. Phillips, Harry H. Rogers, E. W. and H. F. Sinclair, George H. Taber, Jr., E. V. R. Thayer, P. W. Thirtle, E. R. Tinker, Alvin Untermeyer, Elish Walker, and A. E. Watts.

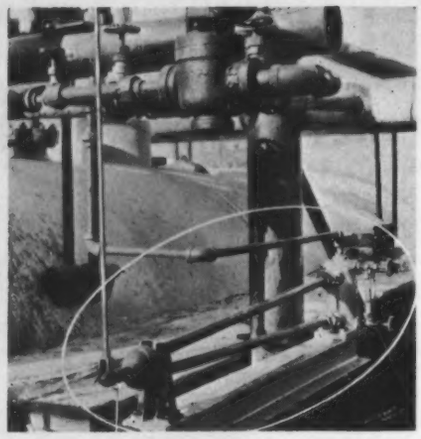
W. M. CARNEY

Carney's Experiment Designed a Still

W. M. CARNEY, chief chemist, Lion Oil Refining Company, El Dorado, Arkansas, began his refinery experience with that company immediately after graduating from Oklahoma University in 1925. Over in the laboratory where he holds forth, the company has provided him with many things through the use of which he is able to duplicate in the lab any process being carried on in the plant. A special experimental vacuum plant was designed and built in a room adjoining his office. Through manipulations of the material through the experimental unit, results were obtained that justified the erection of a large unit in the yard through which the gasoline-free crude is passed.

Johns Joins Technical Staff, Eastern Company

CARL B. JOHNSON, formerly chief chemist for Manhattan Oil Company (now Phillips Petroleum Company) Kansas City, has been made technical superintendent and chief chemist of Franklin Oil & Gas Company, Bedford, Ohio. For two years he was secretary of the petrolum division of the American Chemical Society. Since the sale of the Manhattan plant to the Phillips Petroleum Company he has been with Smith En-



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gineering Company, Kansas City. Franklin Oil & Gas Company operates a compounding plant and grease works at Bedford, producing a complete line of lubricants and specialties.

Day Tests His Product On His Day Off

COMING with Root Refineries in El Dorado, Arkansas, June 1, 1931, as mechanical engineer in charge of knock testing and detonating research, O. E. Day was promoted to chief chemist. Before becoming associated with this company, he had made extensive experiments with different fuels in racing automobiles and airplanes. Recently he has perfected a

O. E. Day

fuel adapted for extremely high speeds obtained in racing cars and high speed plane motors which has a knock rating high enough that it is mechanically impossible to produce a fuel knock by its use in that type of engine.

Being a member of the American Society for Testing Materials and the Society of Automotive Engineers, he has always had his mind directed to the utilization of liquid fuels, especially in relation to the use in high speed high compression motors. Flying extensively, he has a commission in the reserve corps of the air service which he uses to further his experiments in producing a fuel for use in planes. Therefore, he may be said to have a hobby, one that interests him outside of business hours, of racing cars and the various types of heavier than air craft.

Edwards Heads Vacuum Middle West Plants

J. B. EDWARDS, for the past five years vice president and a director of White Star Refining Company (Vacuum Oil Company subsidiary) has been appointed a member of the manufacturing committee of the parent company. In this position Mr. Edwards will have charge of all refining ing activities of Vacuum Company in the Middle West. In addition to the White Star refineries at Wood River, Illinois and Trenton, Michigan, the company controls the Lubrite Refining Company with a plant at East St. Louis, Illinois and the Bartles Maguire Oil Company with its refinery at East Chicago, Indiana.

Engineer Returns From Japan

A. B. PECKHAM who was sent to Japan by Associated Oil Company of California to assist in the construction of the refinery of Mitsubishi Oil Company Ltd., (jointly owned by the Associated concern) has returned to Los Angeles to take up his former duties at the Avon, California, refinery. Mr. Peckham reports that demands for oils have been increasing in Japan at the rate of about 15 per cent annually for the past several years.

Bigelow Joins Gladetex Company

O. E. BIGELOW, formerly supervisor of technology for Grayburg Oil Company, refining division, San Antonio, Texas, has joined Gladetex Refining Company and is in charge of refinery operation at the company's East Texas refinery.

Pioneer Refining Official Dies

GEORGE C. WEAVER, Tiona Refining Company, Clarendon, Pennsylvania, died at his home in Clarendon, January 6. Mr. Weaver was 71 years of age, retired from active service about a year ago after 46 years with the company during which time he served as refinery superintendent and later as general manager of the company.

PLANT ACTIVITIES

ANNOUNCEMENT of new model automobiles for 1932 the majority of which demand a high anti-knock value motor fuel for satisfactory performance indicates that the recent and present construction program of the refining industry is in line with the demand trend of the automotive industry. Motors requiring high octane number gasolines for their operation are rapidly increasing in number, and this development necessitates construction of additional cracking facilities, gasoline reforming equipment, and in conjunction, gasoline stabilization and recovery systems.

Reports for the last 30-day period indicate continued construction of refining equipment in line with previously published survey material and indicate that the average monthly expenditure for construction purposes is holding to the average expected, despite the depressed state of general business.

In practically all of the eight refining districts of this country additional expansion and construction work is under way. Cracking units are being erected in most of the districts, and additions to gasoline recovery and debutanization and stabilization systems in many areas are now under way.

Practically all refiners agree now that there will never be a satisfactory market for straight run gasoline (except possibly, gasoline from such grades as Smackover and most California crudes) and the result of such conviction is reflected in the announcements or proposals of new work in refineries, especially in the cracking departments.

Much construction work is actually under way in foreign refining and much additional expansion is scheduled for 1932. The growing refining industry in countries such as France, Germany, Spain, England, Roumania and Russia (with some additional construction under way in South America and Mexico) foretells the continued decrease of American exports of refined products. Canadian refinery construction work is about complete and the expansion of refining facilities started in Japan last year has been brought to its conclusion.

The natural gasoline industry is relatively quiet insofar as expansion and new construction is concerned with such work as is under way confined to the construction of new stabilization systems, some of which are designed for the preparation of new stabilization systems, most line and liquefied petroleum gases. Some construction of importance is under way in the East Texas areas.

New Construction

Conroe Refining Company has been organized by Strake Oil Corporation interests with plans to erect a 300 barrels skimming plant on the Houston-Conroe highway south of the town of Conroe, Texas. Strake Oil Corporation is laying a two-inch line from the site to the recently completed discovery well in the Theodore Slade Survey, central Montgomery County.

Creole Petroleum Company is progressing rapidly in the construction of its new topping plant at Carapito, Venezuela, and is scheduled for completion in March. Fuel oil from this plant will be shipped to Chile to nitrate producers to apply on the recent 750,000 barrel contract secured by Standard Oil Company of New Jersey.

Compagnie Francaise de Raffinage, manufacturing and distributing subsidiary of Compagnie Fraincaise des Petroles, has awarded contract to Arthur G. McKee & Company, Cleveland, through that company's associates, Schneider et Cie, Paris, France, for the construction of primary crude oil distillation equipment, totalling approximately $1,000,000. The refinery development (totally valued at $15,000,000) will utilize the French share of the Iraq oil output. The refinery will be erected at le Harve, on the Tancarville canal and is the first of two large plants to be erected by the concerns involved. The French government has certain vested rights in Compagnie Francaise des Petroles and has a preferential right to purchase finished products from Compagnie Francaise de Raffinage.

Following the World War, Great Britain was given the mandate over Mesopotamia, with its rich oil possssions. Later France and the United States each obtained a share in the Iraq oil. The American share is controlled by Standard Oil Company of New Jersey and associates. At present and largely through the influence of France, a 1000-mile pipe line is un-

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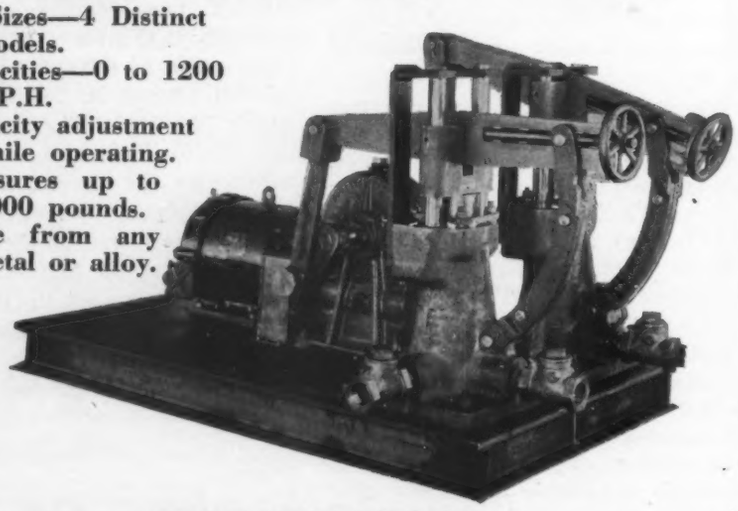

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der construction from the Iraq field to the seaport.

Elwerath Gewerkschaft will start operating its new refinery near Hanover, Germany, during February. The $1,000,000 refinery was erected on the bank of the canal at Misburg by Arthur G. McKee & Company. The plant has a rated gasoline capacity of 2600 barrels and consists of crude distillation unit, redistillation equipment and Dubbs cracking facilities.

Continental Oil Company, at its Wichita Falls, Texas, refinery is erecting a modern gasoline stabilization system, to be placed in operation in the near future. Black, Sivalls & Bryson is installing the new unit.

Torrance Refining Company, Los Angeles, recently organized by E. A. Wiley, has acquired the refinery completed a few months ago on the site of Exeter Oil Company's former natural gasoline plant in the Torrance field, and plans to begin operation soon.

Coastal Petroleum Corporation will start operating its new 6000 barrel refinery on Blakely's Island in Mobile Bay, Mobile, Alabama, early in February. The plant was designed by J. P. Devine Manufacturing Company, with the distillation system consisting of a combination skimming and viscosity reducing unit for East Texas crude. It is equipped with a tower on which three grades of gasoline are produced simultaneously, together with a kerosene stream. (Ref. & N. G. M., Jan., 1932, page 68A and Oct. 1931, page 131).

Indian Chemical Company has been incorporated to build a plant on the property of the Santa Fe Springs Water Disposal Company for the purpose of making iodine from the waste salt water from oil wells. F. N. Rumbley is president of the company, and H. F. Emme is vice president. Both formerly were with General Petroleum Corporation. Offices are in Mr. Rumbley's suite in the Higgens Building, Los Angeles.

La Porte Oil & Refining Company, headed by J. D. Wrather of the Amarillo Producers & Refiners Corporation, has taken an option on a site for the construction of a refinery at La Porte, Texas, in the Houston refining district. G. R. Gurley, Gurley Oil Company, is associated in the project. The plant proposes to refine 2000 to 2500 barrels

of crude daily, processing East Texas crude. J. G. Strawn and J. E. Golden, both of La Porte, will be associated with the new concern. This activity was reported last month in these columns as Kilgore Oil Company, builders of the La Porte refinery.

Continental Oil Company, Ponca City, Oklahoma, has given contract to Alco Products, Inc., for the installation of a 4000-barrel daily capacity unit of the Stratford treating system. This installation is designed for continuous acid treating for producing gasoline of reduced gum content, stable color and high anti-knock value. The installation is going in in the company's Baltimore, Maryland, refinery.

South Kentucky Pipe Line Company is erecting a 500-barrel skimming plant at Somerset, Kentucky. A. T. Judy is the head of refinery operating and Elmer Tate is in charge of sales. The plant is located on the Southern Railway.

▼ OPERATING ▼

Producers & Refiners Corporation recently completed construction of a new natural gasoline plant and has placed it in operation in the Wertz field, 40 miles from Parco, Wyoming, and at the same time, dismantled an obsolete installation. The new plant has a rated capacity of 18,000,000 cubic feet of gas daily.

Compania Mexicana de Petroleo "El Aquila," S. A. has completed construction of its 12,000-barrel refinery at Atzcapotbalco, near Mexico City, Mexico, and plans to begin operations early in February. R. W. F. Newton is general superintendent and is assisted by T. D. Dinsmoor. The refinery is built on the unit-plan allowing for easy future enlargement.

Nacogdoches Refining Company's 3500-barrel refinery at Nacogdoches, Texas, is now under option to George Gainter who plans drilling several shallow wells in the nearby field where oil yielding a high percentage of lubricants is produced. Pending production developments the plant will not be operated.

Phoenix Refining Company, San Antonio, operator of a skimming plant in the Pettus field, Southwest Texas, has purchased the 500-barrel capacity skimming plant formerly operated near Dallas, Texas, by Texas Eagle Refining

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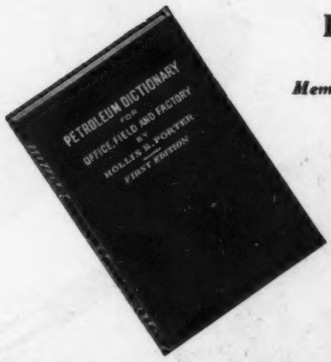

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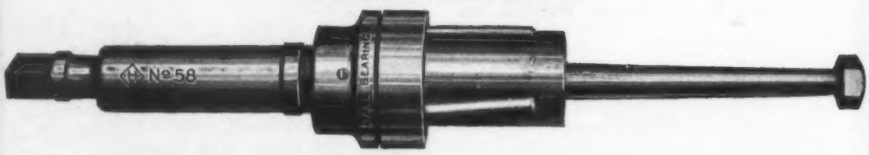

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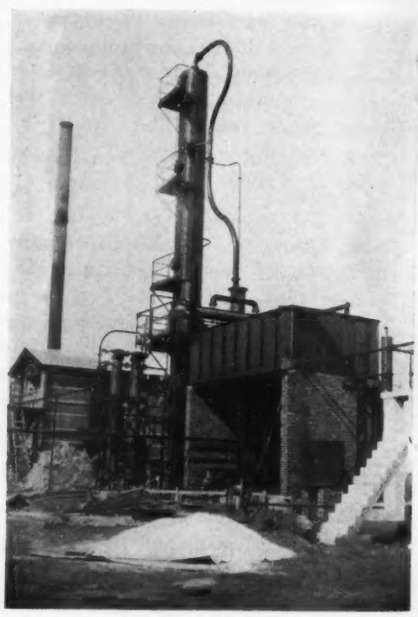
Company through receiver for the latter concern for $10,000. The new owners have arranged to resume operation of the Dallas plant, using high gravity crude from East Texas. Raymond R. Russell is president of Phoenix Refining Company, and is also head of Russell Oil Company, which is engaged in the bulk and retail distribution of refined products in Dallas and San Antonio.



Bowling Green Refining Complany Plant

Bowling Green Refining Company, Bowling Green, Kentucky, organized during the summer of 1931, has completed construction of its 1000-barrel modern skimming plant, consisting topping plant, steam plant, treating system, loading track and racks, laboratory, office building, bulk station and tankage facilities. Crude oil is delivered to the plant by Ohio Oil Company. The plant was erected under the supervision of F. J. Tierman, acting for Leader Iron Works, builders. The plant is operated under the supervision of S. E. Davis.

Louisiana Oil Refining Corporation, Shreveport, will have pipe line outlet for gasoline as soon as the crude oil carrier between that point and Port Arthur, Texas, can be converted into a gasoline line. Cities Service recently leased this pipe line from The Texas Company. February 1 announcement was made that the system would be given over to carrying refined products. Cities Service has signed contract with Orange State Oil Company, Miami, Florida, to furnish products and the Louisiana subsidiary will be called upon

to provide gasoline, which will be transported by pipe line to tidewater and then by barge to the Florida east coast.

Maple Leaf Petroleum, Ltd., Coutts, Alberta, plans to resume operation of its refinery. The plant was formerly operated by Maple Leaf Oil & Refining Company. It will operate at the rate of 1000 barrels per day with plans for expansion later to 4000 barrels and the possible construction of cracking facilities.

Mountain States Refining Company, Orchard, Colorado, is operating its recently completed skimming plant at the rate of 400 barrels per day, and is adding additional storage facilities. The plant sells its production in the local market of northeastern Colorado.

The Texas Company is reported to have completed arrangements or more aggressive activities in France through the purchase of a 48 per cent interest in La Raffinerie de Petrole de la Gironde. The acquisition is subject to approval of the Office National des Combustibles Liquides, the government oil bureau. The American company will supply crude requirements to the French company's refineries.

Consolidated Refinery Capacity 203,000 Barrels

Refining capacity totaling 203,000 barrels is involved in the Sinclair-Prairie merger. Prairie Oil & Gas Company is not classed as a refining organization but through acquisition of controlling interest in Producers & Refiners Corporation controls 14,000 barrels of refining capacity.

Sinclair Refining Company operates nine refineries with a total capacity of 189,000 barrels for running crude oil and cracking capacity of 99,000 barrels. In addition the company has two shut down plants with 6200 barrels crude capacity and the Sinclair Refining Company of Louisiana owns a 30,000-barrel refinery at Meraux, Louisiana, inoperative for several years, and recently figuring in merger rumors with the Tex-York Utilities Corporation, headed by Count Ivan L. Leschinsky. The combination of the two companies will bring the new organization's refining capacity to 203,000 barrels, with a cracking capacity of 105,000 barrels.

Sinclair Refining Company has but recently completed a major improvement and modernization program involving construction of major proportions at practically all of its operating refineries. The total expenditure for this modernization work involving a large number of modern cracking units, gasoline recovery and stabilization systems, power house building and a complete revamping of its lubricating oil manufacturing facilities at Wellsville, New York, is reported to have totaled $18,000,000 and with the work requiring two years.

Following is a list of refineries owned by the Sinclair organization:

	Crude Capacity	Cracking Capacity
Sinclair Refining Company—		
East Chicago, Indiana..	40,000	35,000
Coffeyville, Kansas	10,000	10,000
Kansas City, Kansas...	8,000	10,000
Fort Worth, Texas....	8,000	.....
Wellsville, New York..	20,000	.....
Gladewater, Texas	2,500	.....
Houston, Texas	50,000	30,000
Marcus Hook, Pa.	20,000	10,000
Sand Springs, Okla. ...	8,000	4,000
Plants not in operation—		
Muskogee, Okla.	1,200	.....
Texas City, Texas	5,000	.....
Sinclair Refining Company of La., Mereaux, La....	30,000	.....
Producers and Refiners Corporation—		
West Tulsa, Okla.	6,000	3,000
Parco, Wyo.	8,000	3,000
Plants not in operation—		
Blackwell, Okla.	3,000	.....

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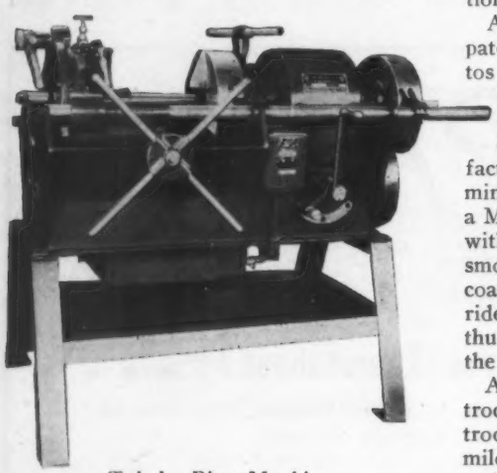
2. Power Pipe Machine

TOLEDO PIPE THREADING MACHINE COMPANY

Toledo Pipe Threading Machine Company, Toledo, Ohio, announces a high speed, one-to four-inch pipe threading and cutting machine which has a frame of all steel construction and is equipped with eight quick-opening die heads and rake type dies—one for each size of pipe.



Toledo Pipe Machine

There are four high-speed cutter knives which work simultaneously, and the quick opening die heads permit instant release of dies after threading. According to the manufacturer, four-inch pipe is threaded in 42 seconds and cut off in nine seconds, and smaller sizes of pipe are threaded and cut off in proportionately less time. Six spindle speeds are provided.

The reamer is of the cone type with a fast steel cutter blade mounted on an arm which can be instantly swung into position for reaming and fed by a carriage handwheel.

A positive action, centrifugal oil pump flows oil on the pipe and dies and cutter knives.

3. Welding Electrodes

METAL & THERMIT CORPORATION

Metal & Thermit Corporation, New York, has placed on the market a new line of arc welding electrodes which have a heavy all-mineral flux coating.

The new electrodes, known as Murex, are made 18 inches long and in types and sizes suitable for a wide range of horizontal, vertical, and overhead welding operations.

A feature of the electrode is a patented spiral winding of asbestos yarn which serves to hold the heavy mineral flux to the core so that it is not injured if the electrode is bent. The manufacturers point out that the all-mineral ingredients of the flux on a Murex electrode cause it to burn without objectionable fumes or smoke, while the thickness of the coating enables the operator to ride the electrode on the work, thus letting the flux coating space the arc.

Among the eight types of electrodes in the Murex line are electrodes for welding commercial mild steel, manganese steel, 18-8 stainless, and stainless iron.

4. Recorder Controller

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The Bristol Company, Waterbury, Connecticut, has a new development in temperature and pressure control instruments in its free vane, air operated recorder controller which incorporates accuracy, simplicity and dependability.

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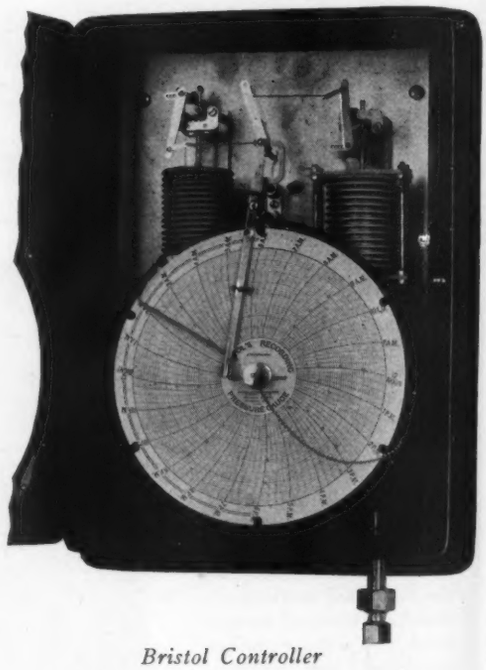

Bristol Controller

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Company.....

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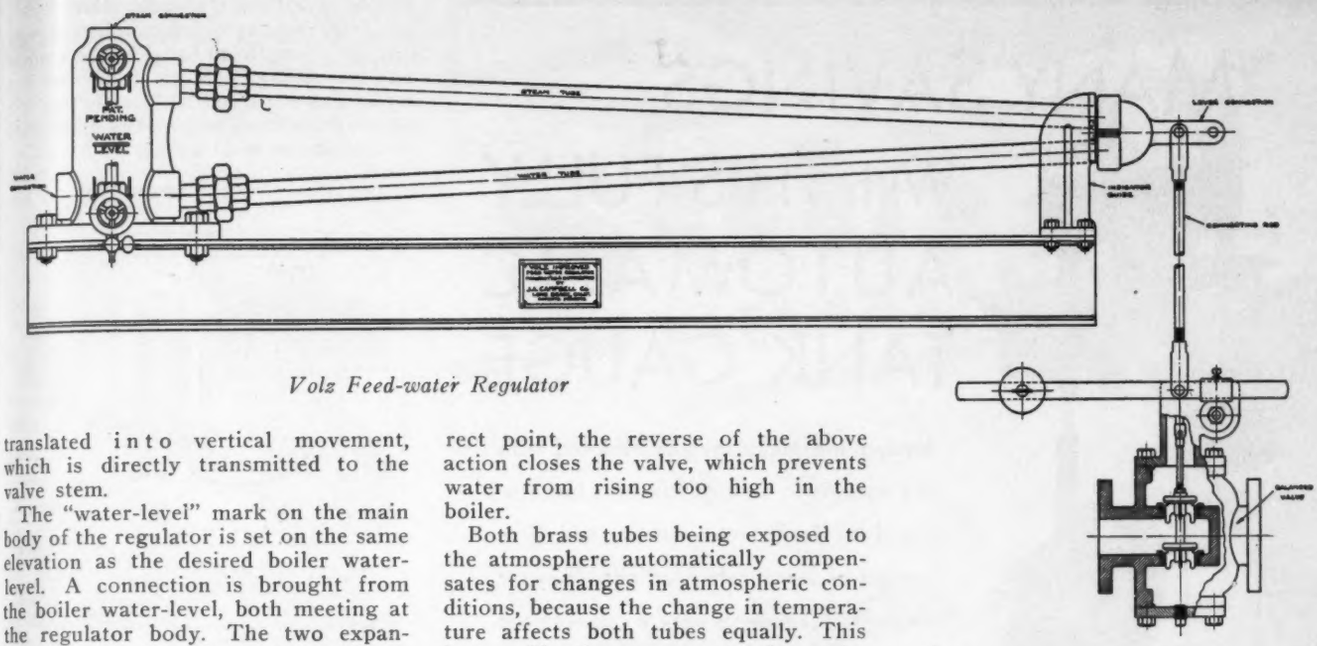
5. Boiler Feed-Water Regulator

J. A. CAMPBELL COMPANY

J. A. Campbell Company, Long Beach, California, recently put on the market the Volz feed-water regulator which consists essentially of two expansion tubes connected into a body casting and meeting at their outer extremities in a close return-bend. The lower tube is the working element and the upper tube the compensating element. The return bend carries a lug, to which the valve linkage is attached; and the expansion and contraction of the working tube induced by slight changes in water-level is multiplied and



Volz Feed-water Regulator

translated into vertical movement, which is directly transmitted to the valve stem.

The "water-level" mark on the main body of the regulator is set on the same elevation as the desired boiler water-level. A connection is brought from the boiler water-level, both meeting at the regulator body. The two expansion tubes leading from the regulator body are of extra-heavy brass pipe and converge in a brass return-bend casting, with a lever connection for operating a balanced valve.

When the regulator is properly installed, the water-level in the lower tube is approximately three-quarters of the way out from the gauge-glass chamber. In operation, the upper part of the regulator body and the upper tube are, of course, filled with steam, which meets the water in the lower tube.

If the rate of steaming increases, the water-level will drop slightly in the boiler and also in the regulator. This brings steam further down into the upper end of the water tube, causing the tube to expand; thereby raising the lever and opening the balanced valve. When the water-level rises to the correct point, the reverse of the above action closes the valve, which prevents water from rising too high in the boiler.

Both brass tubes being exposed to the atmosphere automatically compensates for changes in atmospheric conditions, because the change in temperature affects both tubes equally. This feature likewise compensates for variations in steam and water temperatures due to changes in boiler pressure. This device will operate any standard balanced valve, and can be fitted to any type of boiler where automatic regulation of the water-level is desired, according to the inventor, G. W. Volz.

6. Automatic Oiling System

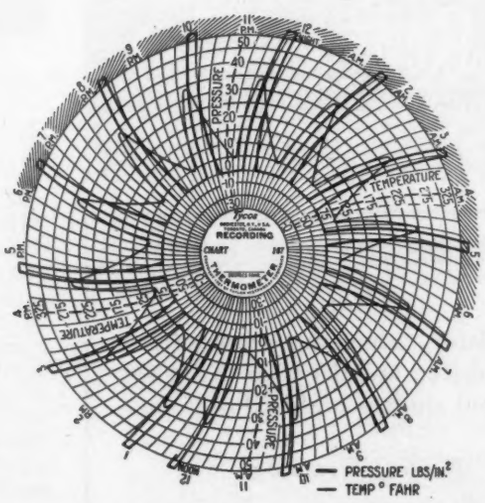
MOTOR AND PLANE ACCESSORIES, INC.

Motor and Plane Accessories, Incorporated, Detroit, Michigan, has developed a novel automatic oiling system for industrial machinery which operates electrically without pump or other moving parts.

It consists of a Westinghouse oil tank equipped with a heater unit which is separated from direct contact with the oil. When the machine that is to be lubricated is started, the electric heater unit inside the tank is automatically turned on. Thus the temperature of the oil is raised, causing it to expand and force itself out of the tank to bearings, where metering devices control the flow.

After temperature of the oil reaches 150 degrees, a thermostat breaks contact and allows the oil to cool to 100 degrees, at which point the thermostatic switch again makes contact. During the cooling process a vacuum occurs which is utilized to refill the tank from a central reservoir. A check valve is used in the main feed line to prevent drawing the oil back from the bearings when the vacuum is operating. To maintain pressure on the main line while the tank is filling, an auxiliary feeder is installed which continues to hold the pressure while the tank is being replenished.

Automatic oil system top with the terminal cover removed showing the heating element for expanding the oil



Test chart showing the operation to the automatic oiling system. Note how the pressure increases to 53 pounds per square inch while the temperature builds up to 150 degrees. A complete oiling cycle occurs approximately every two hours.

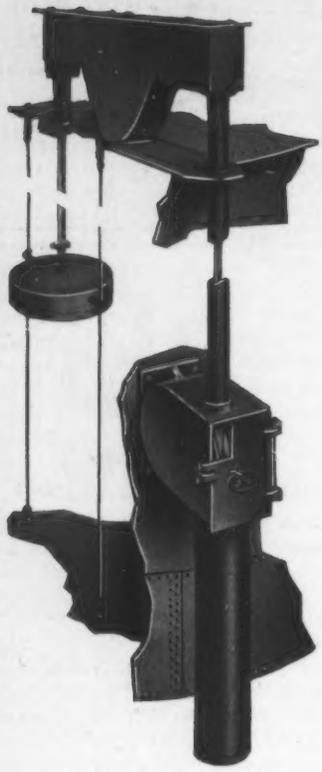
7. Boiler Water Level Recorders

BAILEY METER COMPANY

Bailey Meter Company, Cleveland, Ohio, has developed a complete line of boiler drum water level recorders and indicators to give operators a complete picture of the rate of change of water level and show the true level throughout the full range of the drum.

The Bailey boiler water level recorder operates on the difference in level obtained by making two connections to the water column or boiler drum; one connection being made to the water space, and the other to the steam space where a constant water head is maintained in the connection by means of a steam condensing radiator and a reservoir. The variable head or water space connection is applied over a mercury sealed bell and the constant head connection is applied to the inside of this bell. As the boiler water level rises or falls, the mercury sealed bell falls or rises and this motion is transmitted to the recording pen by a

MANY SAVINGS With THIS FULLY AUTOMATIC TANK GAUGE



Phantom view showing S & J Automatic Tank Gauge installed on cone type roof. Regardless of tank height, the indicating tape is visible at the gauge reading box located but five feet above the ground level. Adjustable indicators compensate for temperature changes.

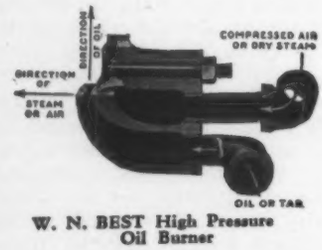
Among the many savings effected with this automatic tank gauge are: Greater speed of tank measurement and prevention of inaccurate readings. Gauger makes all readings at a convenient height on the outside of the tank. No sticking and no climbing on top of tanks. Accurate operation of this gauge is assured by rigid construction and use of non-corrosive materials. Openings through top of tank are oil-sealed against vaporization losses of liquid in storage. Adapted to tanks having water-seal, cone or floating roofs. Send for Bulletin No. 52—it fully describes the gauges and other S & J quality products for storage tanks.

SHAND AND JURS CO.

BERKELEY CALIFORNIA

S&J REG. U.S. PAT. OFF.

NEW YORK · DENVER · TULSA · HOUSTON · LOS ANGELES · SEATTLE



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W. N. BEST Oil Burners

are

dependable, efficient, economical, non-clogging atomizers of fuel oils, tars, acid sludges and still bottoms.

Write for catalogs.

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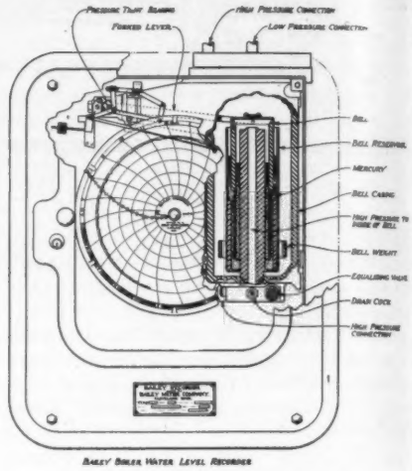
Engineers and Manufacturers Since 1890

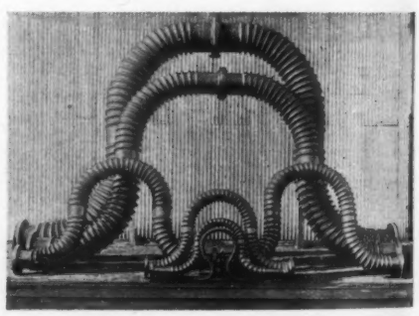
295 Fifth Avenue, New York City

forked lever and a spindle which turns in pressure tight bearings. A reversing linkage is employed between the spindle and recording pen so that the pen moves upward as the water in the boiler drum rises and moves downward as the water level drops.



Bailey Boiler Water Controller

The water level recorder may be incorporated with a feed water flow meter to record the two related factors on one chart for easy comparison. Remote indicators or recorders operating from the main recorder can be placed at other points, if desired. A large variety of types and combinations are available in all pressure standards up to 1800 pounds per square inch.



Corrugated Pipe Bends

8. Corrugated Pipe Bends

STANDARD PIPING & FITTING CO.

Standard Piping & Fitting Company, 49th and Gray's Avenue, Philadelphia, is offering the "Aiton Process" corrugated pipe bends, having been granted exclusive license to manufacture these bends in the United States. The corrugating of plain pipe adds the advantage of flexibility, which is available in all directions permitting safe connection in close quarters and where vibration and weaving are a factor. Preparations are now being made to produce these bends in this country and American made "Aiton Process" bends will be available about July 1. In the meantime the company is filling its needs by importing English bends with plain ends, supplying and attaching American flanges in the Philadelphia plant.

9. Tank Equipment

COLUMBIAN STEEL TANK CO.

Columbian Steel Tank Company, Kansas City, Missouri, announces several new developments for use on oil storage tanks, including a plain thief hatch, a vacuum pressure thief hatch and a vacuum pressure valve device.

Columbus Tank Fittings

The plain thief hatch is non-sparking, vapor tight and corrosion proof under all conditions. The lid raises at four ounce pressure.

The Columbian vacuum pressure thief hatch is a compact triple service mechanism, vapor tight and made of corrosion proof and non-sparking material. Its pressure range may be adjusted from four to 16 ounces and the vacuum valve opens at one half-ounce. This item is all metal—no rubber gaskets. The vacuum mechanism is springless, the vacuum valve consisting of a counterbalanced vacuum plate.

The new Columbian vacuum pressure valve device uses Bakelite for the valves and valve seats, not being affected by the corrosive action of sour oil conditions. The valve parts are interchangable and either valve may be removed from the main housing and adapted individually in any position desired. This valve is built regularly for four-inch pipe connection.

10. Small Steam Turbine

MOORE STEAM TURBINE CORP.

Moore Steam Turbine Corporation, Wellsville, New York, has placed on the market a new turbine, known as Type U2RA, to meet the need for a highly efficient and reliable steam turbine for sizes up to 60 horsepower.

This turbine has all essential features found in the larger turbines, such as horizontally split casing, carbon packing,

SOLVAY

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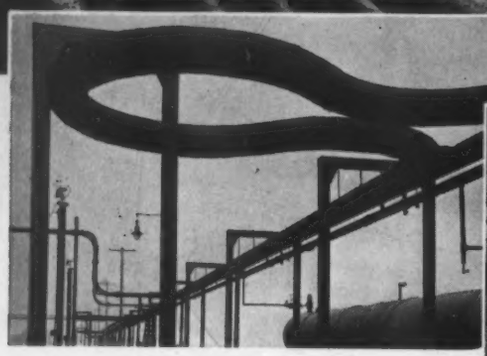
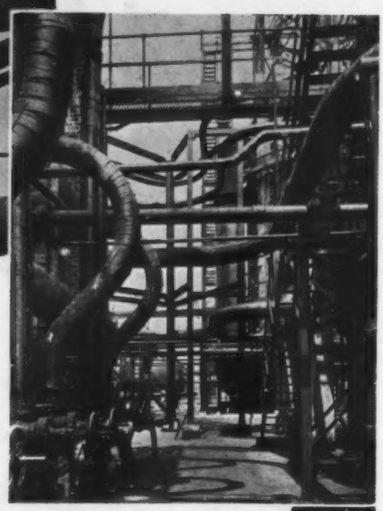




A maze of piping—a maze of problems in design! A typical installation recently completed by Power Piping Company—over 83 carloads of fabricated piping with accuracy and dispatch! Yet not unusual for this organization, experienced in designing, fabricating and erecting, and in furnishing technical assistance for any particular need! Put your piping problems up to

•

Power Piping
FOR EVERY INDUSTRIAL NEED

POWER PIPING CO. • PITTSBURGH

emergency overspeed governor with independent trip valve, hardened tool steel governor wearing parts, babbitted bronze-backed split bearings, water cooled bearing cases, stainless steel governor valve and valve seats, heavy blading of stainless steel or nickel steel, and auxiliary nozzles for overload. Low steam consumption is secured by the use of a highly efficient turbine wheel of ample diameter.

Moore Steam Turbine

This turbine is of cast iron construction for moderate steam pressures and of all steel construction with centerline support for steam pressures up to 600 pounds and temperatures up to 800°.

11. Steam Jacketed Valves

MERCO-NORDSTROM VALVE CO.

Merco Nordstrom Valve Company, 343 Sansome Street, San Francisco, has placed on the market a new series

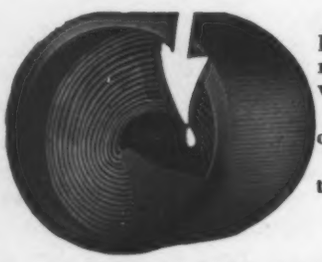
Merco Nordstrom Valve

of valves for use in conjunction with steam jacketed piping. The valves are offered in semi-steel in sizes from two- to four-inch, inclusive.

According to the manufacturer, the valves are rated at 150 pounds line working pressure, and the jackets are designed for a maximum saturated steam pressure of 100 pounds with a maximum temperature of 327° F.

The Nordstrom valve embodies a lubricated plug cock, and, by use of the steam jacket housing, permits the handling of fluids of highly viscous nature. It is cast with a double walled body, the heating space thus formed surrounding the body. The valve is cast for flanges larger than normally used.

The Spiral Motion Is the Trick



That's why Hood's Chemico Spiral Packing Rings have been selected by so many engineers. The center hole prevents choking and clogging.

Made of acid-resisting shale—practically indestructible.

Used by all big producers because of the intensive movements.

Samples on request

B. MIFFLIN HOOD CO., DAISY, TENN.

ITEMS ABOUT MANUFACTURERS

Alloy Pump & Valve Company, 6007 Euclid Avenue, Cleveland, Ohio, has been organized to take over the manufacturing and sales of the acid proportioning pumps, special valves and other alloy products formerly manufactured by Cleveland Alloy Products Company. The latter company will continue in the alloy casting field. Harry Hartling, vice president of the old company, is president of the new organization. He advises that sales representation will continue to be maintained in Tulsa, New Orleans, New York, Los Angeles and will be extended to other centers.

Bailey Meter Company, Cleveland, Ohio, announces appointment of W. J. Reeder as manager of its St. Louis branch office. This appointment fills the vacancy made by the untimely death of C. J. Prendergast, which resulted from injuries received in a building collapse at Paoli, Indiana, a short time ago. For seven years Mr. Reeder has been connected with the Chicago office of the company, where he has had a wide experience in the solution of metering, controlling and regulating problems. He will be assisted by J. R. Buss, who has been located in the St. Louis district for four years. Headquarters will be at 127 Waterman Building, 457 North Kingshighway.

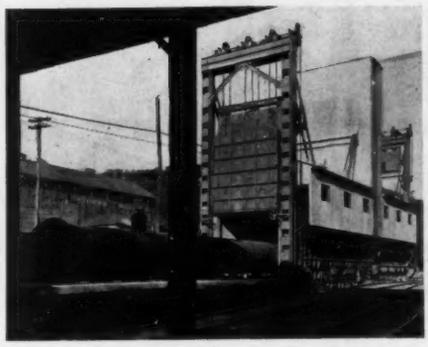
A heavy pressure vessel and a welding job of interest were recently completed at the shop of the American Tank & Equipment Corporation of Oklahoma City, manufacturing subsidiary of Black, Sivalls & Bryson, Inc., Bartlesville, Oklahoma. The photograph shows the shipment made December 19, 1931, to Octane Oil Refining Company of Chautauqua, Texas, for a new 1400-barrel refinery. These towers were engineered by A. J. Smith Company of Kansas City.

Large Bubble Tower Welded by American Tank & Equipment Corporation

The largest vessel in the shipment was a 9′ diameter by 76′4″ long reducing tower and vaporizer, complete with trays. This vessel weighs 101,959 pounds. In addition there was a 4′ diameter by 60′ topping tower and a 3′ diameter by 40′ long absorber tower and a 5′6″ diameter by 15′6″ gas separator. The weight of the topping tower is 26,127 pounds, the gas separator 5800 pounds and the absorber tower 9,585 pounds. The welded vessels manufactured for this installation were entirely "BS&B Flexwelded".

Manufacturer of heavy machinery wants thoroughly experienced pump sales representatives with actual selling experience in either New York, Mid-Continent, Chicago or California areas. Give full details of education, experience, references and enclose a small photograph. Box 314, care Oil Weekly, Box 1307, Houston, Texas.

The Elliott Company of Jeanette, Pennsylvania, has been operating a system for two years whereby men in the shop are paid for accepted suggestions for shop improvements. Accepted suggestions are paid for monthly at the rate of $5 each. At the end of the year an additional prize of $50 is awarded the man who has presented the greatest number of accepted suggestions.



Struthers Wells-Titusville Corporation Annealing Furnace

Struthers Wells-Titusville Corporation recently placed in operation at its Warren Pennsylvania,, works the largest annealing furnace of its kind in the world, the dimensions of which are 18′ x 18′ x 87′. It is of the car type to be used in stress relieving fusion welded pressure vessels and annealing welded alloy steel equipment at temperatures as high as 2150°F.. The view of the furnace shows a welded high pressure cylinder six feet diameter x 65 feet long entering the furnace for heat treatment. The vessel of 'Struthers-Weld" tempered arc process of electric fusion construction complies with A. S. M. E. Code requirements.

American Meter Company announces that Pacific Meter Works has assumed sales and service on the Pacific Coast of Westcott orifice meters, gages and other control devices manufactured by the Metric Metal Works factory of American Meter Company. These products were formerly handled on the Coast by Westcott & Greis, Incorporated, sales agents for Metric Metal Works and other manufacturers in the Mid-Continent. A complete stock of parts and instruments will be carried by the factories of Pacific Meter Works, 2118 Atlantic Street, Los Angeles, and at 495 Eleventh Street, San Francisco. Kenneth C. Tomlinson, will be in charge of sales and service.

Allis-Chalmers Manufacturing Company, Milwaukee, announces that L. W. Grothaus recently has been appointed to succeed C. F. Searle, resigned, as general representative of the company. Mr. Grothaus became affiliated with the Allis-Chalmers Manufacturing Company with the acquisition of the Bullock Electric Manufacturing Company in 1904.

He was transferred to the home office at Milwaukee in 1908, which made possible a thorough knowledge of all of the products manu-

Electrically Driven Centrifuges
Hand Centrifuges
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WILLIAMS, BROWN & EARLE, Inc.
Manufacturers of Laboratory Apparatus
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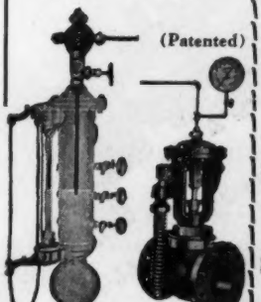
THIS coupon will bring complete information to you concerning any Atlas Regulating Valve for any refinery service.



(Patented)

We make regulating valves for every refinery service. Send us your problems, tell us your regulation troubles, and the ATLAS VALVE CO. will do the rest. Check the items at the right in which you are interested, mail to us, and we will send literature, prices, and any data you may want.

ATLAS VALVE CO.
275 South Street,
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ATLAS VALVE CO., 275 South St., Newark, N. J.
Without the slightest obligation, please send information, including prices, on the following Atlas products:—

☐ Campbell Boiler Feed Pump Governors
☐ Water Regulator Float Valves
☐ Reducing Valves Swing Joint Fittings
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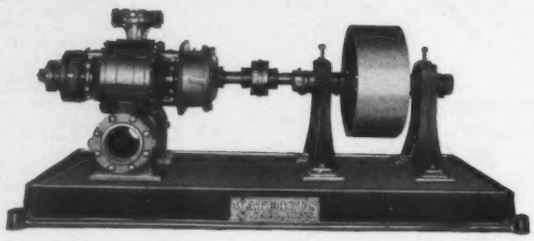
WATEROUS

DEPENDABLE PUMPS



Dependability is the result of rugged construction and of such quality features as hardened steel gears in oil, roller bearings and stainless steel shafts. There is over forty years experience behind the Waterous Rotary Pump.

WATEROUS COMPANY

St. Paul, Minnesota

Agents in principal cities.

Waterous Dependable

ROTO TUBE CLEANERS

built for Oil Still Tubes, 3″ I. D. *and up*

Roto Special 6-way Drill Head and Universal Joint.

Roto Air Driven Cleaner with Swing Frame Head attached.

Roto Combination Head and Universal Joint.

THE ROTO COMPANY

Sussex Avenue and Newark St., Newark, N. J.

Items About Manufacturers

factured by the Company. In 1913, he became sales engineer in the Milwaukee district under leadership of C. E. Searle, and continued in that capacity until 1917, when his services were loaned to the government as a member of the staff of the war industries board. Due to his thorough knowledge of electrical and power generating machinery, he was assigned among other duties, the responsibility of allocating the capacity of the steam turbine industry to the war needs of the army, navy and Emergency Fleet Corporation. He remained a member of the War Industries Board until December 31, 1918; returning to the company, he was made manager of the Minneapolis district office and,

L. W. GROTHAUS

later, given charge of the Cleveland sales district. He was next promoted to the position of assistant manager of the electrical department in charge of Norwood Works, and in the fall of 1929, he was transferred again to the home office at Milwaukee, to take up new duties as assistant manager of the electrical department.

Homestead Valve Manufacturing Company, Incorporated, Coraopolis, Pennsylvania, announced the appointment of General Supply and Equipment Company of Baltimore, Maryland, as exclusive sales representative for the "Hypressure Jenny", a spray cleaning machine manufactured by the former.

Fisher Governor Company, Incorporated, Marshalltown, Iowa, announces election of Jasper H. Fisher, who has been associated with the company since 1912, as president. Mr. Fisher has served as secretary and president before, and for the past two years has been chairman of the board of directors of the company. He succeeds L. W. Browne, resigned.

Charlotte Chemical Laboratories, Incorporated, Charlotte, North Carolina, have announced the opening of a new office and warehouse in Houston early in January, with John H. Lewis in charge of sales and distribution of the company's valves, pumps, burners, plugs and seats, chemical brick, acid-proof cement and paint, chemical putty, cleaning materials, asbestos, and silica quartz.

Neilan Company, Los Angeles, has announced that Louis H. Brendel, advertising manager, has been transferred to Boston to direct advertising for Mason Regulator Company, which recently acquired control of Neilan Company. Mr. Brendel had been with Neilan Company four years when the New Year transfer took place. During that time he witnessed a rapid growth in sales of the company.

Items About Manufacturers

Packing Engineering Corporation, formerly The Paxall Company, Inc., of 23 E. North Avenue, Cranford, New Jersey, manufacturers of Ace-O-Pax plastic packing, announces its change of name, effective January 1. The change is in name only, the new name having been adopted as more clearly descriptive of the company's activities.

General Refractories Company, Philadelphia, has announced the following appointments: F. L. McManus, vice president in charge of traffic; D. M. Thorpe, vice president in charge of sales, and L. Tschirky, vice president and assistant to the president.

Schaffer Poidometer Company, Pittsburgh, has announced that Paul R. Winston Company, Construction Building, Dallas, will represent the former as sales representative for Texas.

Strong, Carlisle & Hammond Company has appointed J. P. Dobbins distributor for the Oklahoma district and is maintaining offices at 1724 South Victor Street, Tulsa, Oklahoma. The company manufactures steam specialties such as forged steel inverted bucket type steam traps, etc.

George P. Reintjes Company, Kansas City, Missouri, designers and builders of boiler and still brickwork as well as the developers and marketers of many furnace constructions, including their nationally known arches and expansion tiles, will be represented in the Tulsa area by S. M. Stevens of Stevens Asbestos Products Company, 1235 South Florence Avenue.

The U. S. Stoneware Company, 50 Church Street, New York, announces that it has received a manufacturing and selling license from Andrew M. Fairlie, Atlanta, Georgia, in connection with the Fairlie patents on Hexahelix and Cyclohelix tower packing rings. A new double spiral type has been perfected in which both sides of the spiral are wetter, a feature greatly increasing the effective contact surface.

Reading-Pratt & Cady Company, Bridgeport, Conn., announces appointment of James P. Ferguson as assistant general manager of sales. He has been associated with the company for the past 10 years as sales engineer.

Fairbanks, Morse & Company, Chicago, announces the election of Robert H. Morse, formerly vice chairman of the board of directors, to the positions of president and general manager, to succeed W. S. Hovey on his resignation, December 1. He was born in Chicago in 1878, and began working at the age of 17 years for the company his father founded. During his 36 years of service he has been employed as salesman, department manager, branch house manager, sales manager, president of the manufacturing division, vice president in charge of purchases, first vice president, vice chairman of the board of directors prior to his recent election as head of the company. He is also a director of E. & T. Fairbanks Company, Ltd.

Merco Nordstrom Valve Company has established new offices in Cincinnati in the Chamber of Commerce building. The Charleston, West Virginia, office is being closed.

ISO-OCTANE

(2, 2, 4-Trimethyl Pentane)

Primary Detonation Standard

Dependable Quality — Reasonable Price

Less than 0.1° C. Boiling Range

H. HENRIQUES

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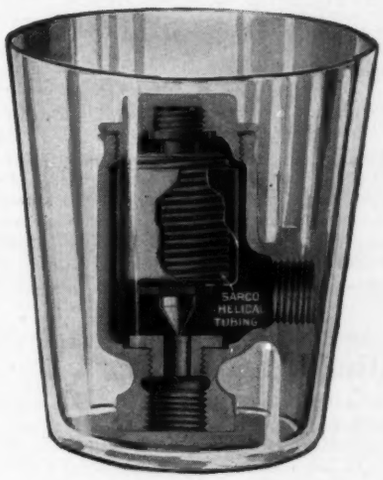
DON'T BE FOOLED BY SIZE



Big traps cannot handle more condensation than the small

SARCO STEAM TRAP

Although the Sarco is so small that it will go inside of a tumbler, it handles as much condensation as big, clumsy traps. Letter recently received from B. H. Rea, Kenton, O., states that the Sarco is "holding its own against more expensive traps."

No trap can discharge condensation faster than it will pass through the valve orifice.

The large orifice in a Sarco Trap enables it to handle condensate as fast as it forms. It returns condensation to the hot well while still hot, so you do not need so much coal to turn it back into steam.

Because of its small size, the Sarco can be screwed into the pipe line.

It costs about one-third the price of big traps, consequently individual units can be trapped inexpensively. That eliminates trapped air and radiation from long pipe lines, resulting in reduced fuel consumption.

FREE TRIAL

Let us send you a Sarco on 30 days' free trial. If not more than satisfied, return it and the trial won't cost you a cent.

Write for Catalog S-95 or mail the coupon.

SARCO CO. INC.

183 Madison Ave., New York, N. Y.

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New York, N. Y.

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☐ **Send a Sarco Steam Trap on 30 days' trial, size..... for pressure..... lbs.**

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Address.....

City..... **State**.....

CATALOGS . . . BULLETINS

Helpful Publications Which Manufacturers Will Be Glad to Send Free for the Asking

Kettles

Sowers Manufacturing Company, 1288-1310 Niagara Street, Buffalo, New York, has published a new 40-page Catalog (No. 8) covering the company's line of seamless jacketed and single shell kettles, mixers, soap crutchers, and vacuum and pressure apparatus. A general discussion of each of the items produced is included.

Refractories

Denver Fire Clay Company, Denver, Colorado, has published a 74-page catalog in which it gives a complete outline of all of its refractories, together with certain valuable engineering information dealing with the subject of application of refractories in industry.

Nitriding Steel

Electro Metallurgical Company, 30 East 42nd Street, New York, has published Technical Bulletin No. CV-1 "Chrome-Vanadium Nitriding Steel" discussing the properties of this alloy. The alloy was developed by Union Carbide and Carbon Research Laboratories. It has many of the physical properties found in S.A.E. 6100 Series of steels.

Pumps

Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, has ready for distribution a 16-page booklet dealing with its type "M" double suction multistage centrifugal pumps. This bulletin, No. 1642-B, gives complete information concerning construction, and operating efficiencies of this line of pumps.

Control

General Electric Company, Schenectady, New York, recently issued Bulletin GEA-1498 devoted to the selsyn differential follow-up system. This system uses the selsyn principle to give accurate; remote electrical control of either the position or speed of any movable element, depending on the relative position or speed of any second moveable element used as the governing device.

Recorder Controller

Bristol Company, Waterbury, Connecticut, recently published Catalog No. 4001 describing its new free vane, air operated recorder controller, an instrument which employs a principle involving a new departure in pneumatic control.

Pipe and Tubes

National Tube Company, 1802 Frick Building, Pittsburgh, recently issued a 40-page booklet entitled "National U.S.S. Stainless and Heat Resisting Pipe and Tubes."

Fittings, Tools, etc.

A. Y. McDonald Manufacturing Company, Dubuque, Iowa, recently issued a catalog entitled, "Net Price List and Supplement to McDonald Oil Equipment Catalog No. 9." The catalog illustrates and gives net prices on all such equipment as hoses, connections, fittings, special wrenches, joints, couplings, oil pumps, rotary hand pumps, plunger pumps, pump jacks, various power pump combinations, gate valves, pie cutters, pipe tongs, vises, pipe threaders, compressors and tank car safety cones.

Gears

International Nickel Company, Incorporated, New York, recently published a bulletin titled "Gears Made of Armor Plate," which is a presentation of a paper prepared by Robert E. Bultman, assistant metallurgist of White Motor Company. The article presented in the bulletin is concerned with two nickel alloy steel compositions which have proved efficient in coping with violent shocks, complex stresses and high tooth pressures in gears.

Fittings

Taylor Forge & Pipe Works, P.O. Box 485, Chicago, has ready for distribution a new bulletin tabulating up to date dimensional information and price data on the company's line of seamless steel fittings for welding and Taylor Forge flanges.

Needle Valves

The Lunkenheimer Company, Cincinnati, Ohio, describes its complete line of needle valves (bronze and steel) in an attractively illustrated booklet which is now available. The valves described include a wide range of patterns for steam, gas, liquid and instrument lines, with preessures to 3000 pounds.

Vent Units

The Staytite Company, 3608 Polk Avenue, Houston, recently issued a folder entitled "Your Profit Is Escaping at These Points," pointing out the value of its equipment in protecting tanks against fire and evaporation losses.

Motors

Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, Missouri, has issued loose-leaf Bulletin No. 173 Part 4 on type RG, brush riding, repulsion-induction motors.

Stainless Steel

American Stainless Steel Company, Commonwealth Building, Pittsburgh, has ready for distribution an interesting and valuable booklet "Forward With Stainless Steel" in which the various applications of this product are illustrated pictorially and discussed in an interesting manner. A partial list of corrosive agents to which stainless steels are either wholly or practically immune, is included.

Liquid Caustic Soda

The Columbia Alkali Company, Empire State Building, New York, has published a 30-page booklet, semi-technical in nature dealing with Columbia Liquid Caustic Soda. In addition to a discussion of the economy of the product the booklet includes discussion of various methods of unloading and handling the material, types of equipment, such as tanks, pipe lines, pumps, valves, and the like.

Gears

General Electric Company's Schenectady office has recently mailed out a four-page folder covering G-E Textolite gears and gear blanks, carrying pictures, detailed descriptions, and a performance chart. The G-E Fabroil gears and gear blanks are described in a similar folder, and either piece of literature will be sent interested persons upon request.

Valves

Reading-Pratt & Cady Company, Bridgeport, Connecticut, gives a complete description of the new Lubrotite gate valve with its uses in a 16-page booklet recently issued. This valve differs from the ordinary gate valve in that it has a unique duct system for introducing a lubricant-seal between the seating surfaces. This results in tight seating even though the seats of the valve become injured in service, is to retard corrosion, and give easier valve operation.

Rotary Compressors

Vilter Manufacturing Company, Milwaukee, manufacturers of refrigeration equipment has ready for distribution bulletins Nos. 42 and 40 dealing with its line of rotary compressors with sleeve type rotors for ammonia compression, and the new Vilter "PakIce" machine, a new development in refrigeration perfected in the company's research laboratory and applicable to the removal of wax from lubricating oils. Copies of these bulletins can be secured from the company.

Cast Iron

Central Foundry Company, Graybar Building, 420 Lexington Avenue, New York City, has issued a six-page folder covering its universal dual-lok joint cast iron pipe and fittings, for manufactured and natural gas distribution, which will be mailed upon request. The cast iron pressure pipe, built for safety against leakage, is fully described and illustrated in this folder.

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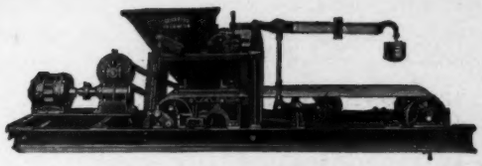

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THE MONTH IN REVIEW

Bureau Questionaires

AT this time of the year the various government bureaus such as the Bureau of the Census and the Bureau of Mines are sending the annual questionaires to the industry urgently requesting that they be filled out completely and promptly returned. Out of such co-operation comes the annual list of refineries in the United States, the survey of cracking units, the list of natural gasoline plants, annual statistics of production, wages, pay-rolls, materials and power consumed, most of which are free for the asking by mailing requests to the Section of Publications, Bureau of Mines, or the Superintendent of Documents, Government Printing Office, Washington, D. C. These questionaires include inquiries concerning materials consumed, types of machinery and equipment in use or under construction, and the information secured in this manner is the basis for important market studies and commercial research highly useful to the industry. Early attention to the questionaires is appreciated by the men in charge of such work, as is the completeness of the answers—all of which contributes to the early release of the information.

Oil in the Tax Mill

WHEN the tax bill for balancing the budget of the United States treasury came from the ways and means committee of the house March 7 it did not carry the provision for an excise tax of one cent a gallon on gasoline, as had been proposed in February. Several parts of the measure, however, did apply to the petroleum industry as follows:

A tariff or excise levy of one cent a gallon on imported crude oil, fuel oil, gas oil or gasoline.

An excise tax of one cent per quart on domestic sales of lubricating oil of 20 to 70 S. A. E. numbers inclusive.

A sales tax of 2¼ per cent on all manufactured petroleum products.

An increase in the corporation tax from 12 to 13 per cent.

The sales tax of 2¼ per cent was the proposed schedule for all manufactured articles. It will, if adopted, be in addition to other taxes now imposed upon gasoline by the states.

The one cent per quart tax for lubricating oil will meet opposition when the tax measure comes up for debate. Those who opposed the one cent federal levy on gasoline will strive to have this four cents per gallon tax on lubricating oil removed from the bill on the contention that it is a class tax, since lubricating oil will be filling its share in the tax-raising program by reason of the 2¼ per cent imposed at the time of manufacture.

The measure as drawn would exempt all manufacturers whose annual volume is less than $20,000 per year. In the petroleum industry this is looked upon as a further incentive for tax evasion, since it will be possible to escape the tax by maintaining small refining and compounding plants.

Although the special federal levy of one cent per gallon on gasoline was not recommended by the committee there is still fear that an effort will be made to put this shedule into the measure during its course through the two branches of congress.

The tariff on imports will meet opposition in the New England delegation in congress. These congressmen contend that a duty on oil imports will apply especially heavy to manufacturing in that territory, where oil is the fuel commonly used in manufacturing plants. It was this delegation which defeated the oil tariff in the previous session of congress.

Cost of Crude From Venezuela

FIGURES submitted to the congressional committee by Wirt Franklin, leading proponent of oil tariff legislation and ascribed to a competent authority having had personal experience in the refining of Venezuelan crude, quote a figure of less than seven-eighths of a cent per gallon as representing the cost of gasoline made from Venezuelan crude. The calculations which yielded this result, however, were based on values which no longer obtain. By substituting current quotations, it is possible, by the method there used, to arrive at a figure of 4.36 cents per gallon as approximately the net cost of gasoline made from Venezuelan crude, f.o.b. Atlantic ports.

Franklin's technical adviser was quoted as having said that "Tankers under American registry transport this crude for 14 cents per barrel, and foreign ships for 11 cents." Drawing on his own experience, and giving detailed figures to support his conclusion, this adviser estimated that the cost of refining Venezuelan crude averages 20.99 cents per barrel. Accepting the tariff commission's figure of 62 cents per barrel as representing the value of crude f.o.b. Venezuelan terminal, a total of 96.99 cents per barrel was established as representing the cost of producing, shipping, and refining an average barrel of Venezuelan crude.

Substituting present values for the figures reported by the tariff commission, it is found that the proceeds from the sale of the derivatives of such a barrel of crude would be approximately as follows:

Gasoline, 42x.30[1]x5¾[2]	$0.7245
Fuel Oil and Gas[3], .70[1] x 60[2]....	.42
Total yield	$1.1445
Less cost, as indicated above...	96.99
Net profit, per barrel.....	.1746

This figure of approximately 17½ cents per barrel, plus any profit which may be realized in producing Venezuelan crude for less than 62 cents per barrel, the tariff commission's figure, may therefore to taken as indicative of current profits from Venezuelan oil operations.

[1]"The cracking operation increases the unit volume sufficiently to compensate for losses in normal refinery practice, so that the total recovery is 100 per cent, and the finished products consist of approximately 30 per cent of gasoline and 70 per cent of fuel oil and gas."

[2]New York Harbor prices on U. S. Motor gasoline, below 65 octane number, and Grade C bunker fuel.

[3]"Since gas is credited with the full fuel value, the gas and fuel oil will be considered together in calculating costs and yields . . . "

Coal Conference Proceedings

ANNOUNCEMENT is made of the publication of the Proceedings of the Third International Conference on Bituminous Coal, which was held under the auspices of the Carnegie Institute of Technology, Pittsburgh, Pennsylvania, in November, 1931. The proceedings, printed in two volumes of approximately 900 pages each, include all papers and discussions delivered at the four-day meeting. Contributions of scientists from Belgium, France, Germany, Holland, Italy, Japan, Roumania, Spain, Sweden, and the U.S.S.R. have been translated into English. Illustrations and graphs have been incorporated in the books.

Among the subjects which were dis-

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cussed by outstanding experts during the conference and which are included in the two volumes are: economics of the bituminous coal industry, competition between fuels, low temperature and high temperature carbonization, coal carbonization problems, gasification, by-products, hydrogenation and liquefaction, railway and steamship fuel, domestic utilization of coal, power plant fuel, pulverized fuel, smoke and dust abatement, preparation of coal, coal cleaning, origin and classification, and steam pollution.

Of the 98 papers included in the proceedings, 39 were contributed by Americans, 22 by British scientists, 20 by German fuel technologists, and seven by French. The third proceedings are similar to the two sets previously issued. These books are regarded throughout the world as standard reference works on fuel technology. Copies can be secured by writing L. J. Moore, Carnegie Institute of Technology, Pittsburgh, Pa. Price per set of two volumes—$15.00.

Properties Of Methane

"PHYSICAL-Chemical Properties of Methane," Information Circular No. 6549, by H. H. Storch, Principle Physical Chemist, United States Bureau of Mines, Pittsburgh Experimental Station, is being distributed by the Section of Publications, Bureau of Mines, Washington, D. C. Mr. Storch has prepared a very thorough correlation of data relating to methane and reports results a large number of experiments, resulting in a valuable addition to the literature on the subject.

Safety at Petroleum Cracking Plants

A report on the subject of "Safety at Petroleum Cracking Plants" is being prepared for early publication by the United States Bureau of Mines, Department of Commerce. A section of this paper, which is being written by engineers of the bureau's San Francisco field office, will be devoted to the description of a tight wire measuring apparatus for use in inspecting pressure and acid equipment at petroleum refineries. A great deal of interest in this equipment has been aroused by the welfare departments of various refining companies on account of disastrous failures to such equipment due to corrosion. As equipment used for carrying these high pressures is of such a nature that it is very difficult to measure the thickness of the walls of the vessels from time to time without actually drilling holes into them, the tight wire measuring apparatus seems

likely to be a very valuable device. It will make possible the detection of portions of the equipment which have been weakened by corrosion without the necessity of further weakening the walls by drilling holes which must later be plugged.

Continuous Pipe Still and Tower Attracts Interest

The continuous pipe still and fractionating tower developed in the San Francisco laboratories of the United States Bureau of Mines has attracted much attention among refinery engineers and chemists. The apparatus has now been perfected to such a point that it is possible to make a series of runs each of which practically duplicates the condition of the foregoing runs. When the apparatus was first constructed it was found difficult to obtain the high vacuum required on account of leaks. These were not so much at joints as in the aluminum castings of which the main portion of the tower was constructed. However, after weeks of painstaking care, all these leaks have been discovered and repaired. At present the apparatus is operating very satisfactorily and is believed to be the only set-up of its kind in the United States.

Encouraging results have been obtained from experiments conducted by the Bureau of Mines and the State of Colorado, using a small continuous cracking still for cracking shale oil. The presence of nitrogen in the crude oil has been found to influence the cracking temperature, causing some fractions to begin to crack at rather low temperatures. A quantity of topped N.T.U. crude gave a yield of 65.5 per cent pressure distillate 29 per cent residue, and 5.5 per cent coke and gas when treated under 100 pounds pressure at 650°F.

The Bureau of Mines, in cooperation with the State of Colorado, in conducting shale oil investigations has made some observations pertaining to shale oil crude pressure distillate which has stood one year. It has been known for some time that when shale oil crude pressure distillate is allowed to stand, a "gum-like" substance is deposited on the sides of the container. The deposit itself is not of uniform thickness, is heavier on the bottom of the container than on the sides and in spots is almost crystalline in character. The "gum" consists of tarry hydrocarbons containing nitrogen and sulphur. The higher boiling fractions of the distillate deposit a greater amount of "gum" than the lower fractions, and there is a corresponding reduction in refining loss when the distillate is treated with sulphuric acid. As a result less acid is required to produce a commercial motor fuel from distillate which has stood for a considerable period of time than from the freshly made distillate.

Fractionation Will Reduce Cost of Gasoline from High-Sulphur Petroleum

The cost of manufacturing gasoline from high-sulphur crude oils may be reduced by proper fractionation methods, is indicated as the result of a study made by the United States Bureau of Mines, Department of Commerce. The importance of proper fractionation in the manufacture of gasoline from crude petroleum is evidenced when gasoline is being made from crude oils containing relatively large proportions of sulphur. Such gasolines usually require considerable chemical treatment after distillation from the crude oil to meet trade requirements as motor fuels.

The cost of the treatment necessary to prepare an acceptable motor fuel is generally the major difference between the cost of manufacturing gasolines from different crudes. The actual cost of distilling equal amounts of gasoline from different crudes varies little, for the amount of heat required to vaporize a gallon of gasoline of the same gravity from different crudes is nearly constant. It must be recognized, however, that depreciation of the distillation equipment is greater with some crudes than others.

An investigation has, therefore, been conducted by the Petroleum Experiment Station at Bartlesville, Oklahoma, which is maintained by the Bureau of Mines and the State of Oklahoma, to determine the effect good fractionation would have on the manufacture of gasoline from crude oil containing sulphur, for if high-sulphur crudes can be distilled so that the cost of preparing gasoline suitable for motor fuel will be reduced by eliminating some of the chemical treating costs, the commercial value of these crudes will be increased proportionally. Preliminary results of the investigation are regarded as quite encouraging.

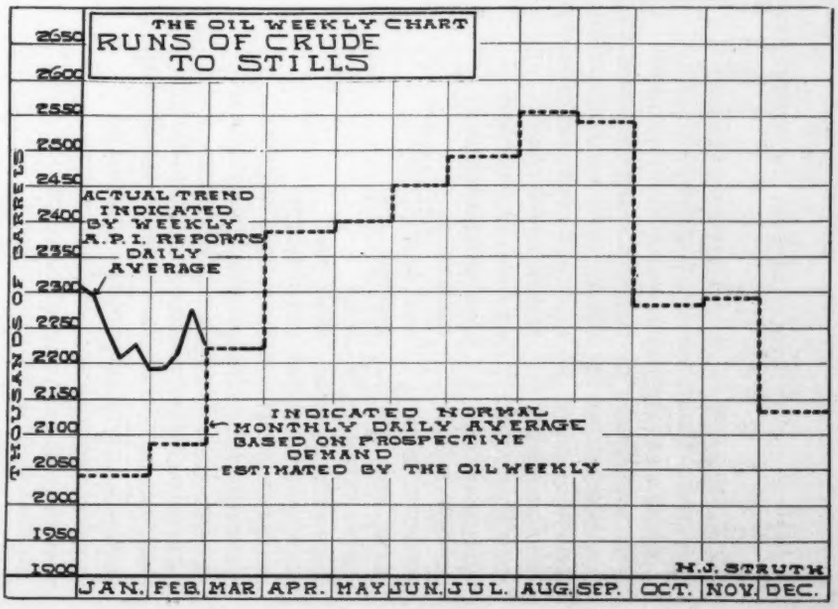
ECONOMICS

By H. J. STRUTH, *Staff Economist*

Oil Horizon Considerably Brighter

RECENT weeks have witnessed a gradual clearing of the horizon and the appearance of constructive developments that point to better times for refiners, marketers and producers. The refining branch has made a concerted effort to control operations and effect a better degree of balance between supply and demand. That the movement is being attended with success is apparent from late reports of runs and gasoline stocks. For the week ending March 5, the rate of crude throughput at refineries in the United States declined nearly 200,000 barrels a day from the preceding week. Runs to stills dropped to a daily average of 2,036,000 barrels, the lowest in years. As a result, gasoline stocks decreased 138,000 barrels, the first decline recorded in more than 15 weeks.

Of further constructive significance in the rate of decline recorded by still runs is that production of cracked gasoline has also been materially reduced. The January report of the Bureau of Mines shows that the average yield of gasoline from crude oil dropped to 44.5 per cent, as compared with 45.2 per cent in December and 46



Crude Runs to Stills, Gasoline Stocks and Gas and Fuel Oil Stocks

Report for Week Ending February 20, 1932

(Figures in barrels of 42 gallons)

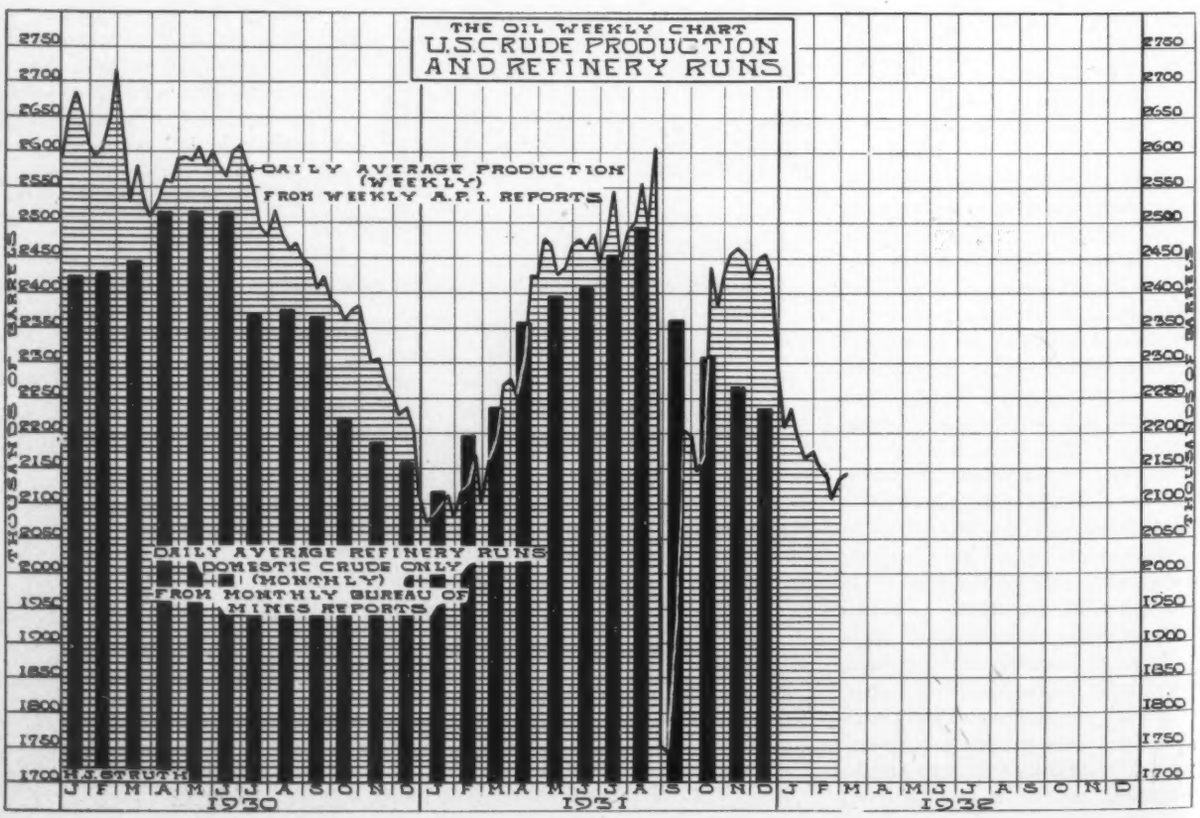
District	Potential Cap. (Daily) Total	Potential Cap. (Daily) Reporting	Per Cent	Crude Runs to Stills Total	Crude Runs to Stills Daily Average	Crude Runs to Stills Per c't Operated	Gasoline Stocks (see note below)	Gas & FuelOil Stocks
East Coast	633,700	633,700	100.0	3,136,000	448,000	70.7	5,923,000	6,881,000
Appalachian	149,600	137,400	91.8	646,000	92,300	67.2	1,718,000	1,183,000
Ind., Ill., Ky.	436,300	431,500	98.9	1,958,000	279,700	64.8	5,448,000	4,756,000
Okla., Kans., Mo.	485,700	435,200	89.6	1,545,000	220,700	50.7	3,877,000	3,351,000
Texas	838,200	765,400	91.3	3,544,000	506,300	66.1	9,200,000	10,420,000
Louisiana-Arkansas	233,100	230,500	98.9	1,065,000	152,100	66.0	1,460,000	3,925,000
Rocky Mountain	160,900	143,800	89.4	262,000	37,400	26.0	2,007,000	702,000
California	914,500	888,100	97.1	3,177,000	453,900	51.1	14,159,000	95,991,000
Total Feb. 20	3,852,000	3,665,600	95.2	15,333,000	2,190,400	59.8	43,792,000	127,209,000
Total Feb. 13	3,852,000	3,665,600	95.2	14,902,000	2,128,900	58.1	43,430,000	128,225,000
Total Feb. 6	3,852,000	3,665,600	95.2	14,783,000	2,111,900	57.6	41,376,000	128,705,000
Total Jan. 30	3,852,000	3,665,600	95.2	14,774,000	2,110,600	57.6	40,746,000	129,419,000
Total Feb. 21, 1931	3,730,100	3,571,200	95.7	15,893,000	2,270,400	63.6	*42,821,000	129,072,000
The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.								
Texas Gulf Coast	532,500	531,500	99.8	2,671,000	381,600	71.8	7,300,000	7,606,000
La. Gulf Coast	147,500	147,500	100.0	797,000	113,900	77.2	1,305,000	3,138,000

NOTE: Stocks at refineries, except in California district, which includes stocks of finished gasoline and engine distillate at refineries, water terminals and sales distributing stations and amounts in transit thereto.

*This figure is not entirely comparable with current stocks due to revisions made since original publication of this figure, for which revisions the basic information is not available by weeks. If it were possible to have made the revision, the new figure would reflect somewhat lower stocks.

per cent in November. Obviously, the tendency to curtail cracking operations will have a two-fold effect upon the gasoline supply in conjunction with the sharp reduction in crude runs to stills. Since the working stocks of gasoline at refineries are actually only about 5,000,000 barrels in excess of normal, it is apparent that the present drastic curtailment movement is bound to result in rapid stabilization of supply.

Inequalities that have existed between the price of crude oil and the market value of gasoline and other refined products are expected to be adjusted soon. Since jobbers' stocks of gasoline are known to be low, there is every reason to believe that the spot gasoline market will react readily to increased buying. The move to curtail gasoline production has undoubtedly been timed just right, since increased buying for spring consumption will find a more united front among refiners on justifiable market values. That concerted realization of the need for control of refining operations will be rewarded by improved financial conditions is borne out by the ratio of demand to supply of all oils. Actually, this index points definitely to a higher scale of prices in both the crude and refined oil market. All that has been needed to allow normal economic factors to func-


THE OIL WEEKLY CHART
U.S. CRUDE PRODUCTION AND REFINERY RUNS
DAILY AVERAGE PRODUCTION (WEEKLY) FROM WEEKLY A.P.I. REPORTS
DAILY AVERAGE REFINERY RUNS DOMESTIC CRUDE ONLY (MONTHLY) FROM MONTHLY BUREAU OF MINES REPORTS
THOUSANDS OF BARRELS
BARRELS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1930
1931
1932

Cracked Gasoline Production

Report for Week Ending Feb. 20, 1932

(Barrels of 42 gallons)

	Potential Charging Capacity			Production	
	Total	Daily Reporting	Per Cent	Total	Daily Average
East Coast	261,300	236,300	94.1	631,000	90,100
Appalachian	56,300	54,100	96.1	164,000	23,400
Ind., Ill., Ky.	330,400	315,400	95.5	520,000	74,300
Okla., Kans., Mo.....	237,800	219,500	92.3	341,000	48,700
Texas	450,800	436,200	96.8	869,000	124,100
Louisiana-Arkansas ..	112,400	112,400	100.0	207,000	29,600
Rocky Mountain	99,900	98,400	98.5	78,000	11,200
California . .....-	190,800	190,800	100.0	366,000	52,300
Total Feb. 20 1,739,700		1,663,100	95.6	3,176,000	453,700
Total Feb. 13 1,739,700		1,663,100	95.6	3,196,000	456,600
Total Feb. 6 1,739,700		1,663,100	95.6	3,029,000	432,700
Total Jan. 30, 1931...1,739,700		1,663,100	95.6	2,962,000	423,100
Total Feb. 21, 1931...1,589,600		1,505,500	94.7	2,753,000	393,300
The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.					
Texas Gulf Coast	352,400	347,400	98.6	717,000	102,400
Louisiana Gulf Coast.	77,000	77,000	100.0	149,000	21,300

tion has been concerted effort on the part of refiners to reduce excessive inventories of gasoline and eliminate the necessity of dumping excess supplies upon the market at "distress" prices. This is being accomplished at present and gives promise of becoming sufficiently effective to sustain a much better general market structure.

The barometer for January, appearing on page 231 of this issue, shows further evidence of the improving statistical position of the industry. It points definitely to a gradual equalization of supply and demand and emphasizes the fact that the industry's price level is about due for upward adjustment. Despite the earlier pessimistic outlook, gasoline demand has shown improvement. Domestic consumption in January was about two per cent above the same period of last year, although the export market slumped 30 per cent below last year. Gasoline stocks at refineries are only slightly above the quantity held a year ago, while stocks of all oils are about 30,000,000 barrels less than they were a year ago. While the recorded rate of new oil production is shown to be abnormally high in comparison with past history, it is no longer recognized as a depressing market factor. In fact, there is no sound reason to regard potential production of crude as a market factor, any more than if the refiner added to his stored supply of gasoline the potential supply available from crude in storage in the United States. The industry has reached a new understanding of economic laws and has apparently awakened to the realization that its troubles have come almost entirely from within, and that they must be corrected from within. Recent developments prove that sound progress is being made in this direction.

Still Runs Curtailed In January

BUREAU of Mines' figures for January show that runs of crude to stills were reduced about 4,000,000 barrels to a total of 68,715,000 barrels; a daily average of 2,217,000 barrels. All of the reduction in runs was in domestic crude; runs of foreign crude were at the same rate as in December. Domestic crude oil consumption by refineries averaged 2,109,000 barrels a day in January, compared with 2,238,000 barrels in December. Foreign crude consumed averaged 108,000 barrels a day in both months. Domestic crude runs were practically the same as those of a year ago, while foreign crude runs showed a decline of 35,000 barrels a day in comparison with the same month of 1931.

Natural Gasoline Output Reduced

NATURAL gasoline production was reduced in January to a daily average of 4,530,000 gallons, compared with 4,710,000 gallons in December. Stocks, however, increased from 27,070,000 gallons in December to 33,974,000 gallons in January. The reason for the increase in stocks was due to a sharp slump in demand for natural gasoline by refineries. Curtailment of cracking operations reduced the output of cracked gasoline to the extent where blending requirements were reduced by about 42,000 gallons a day. The production of cracked gasoline was reduced in January to the extent of 35,000 barrels a day. The proportion of natural gasoline in motor fuel blends in January was 7.3 per cent, in December eight per cent.

Gasoline Stocks Increased in January

DESPITE the fact that runs to stills were materially reduced in January, stocks of gasoline showed an increase over December of about 4,500,000 barrels. This was due to a sharp decline in domestic consumption, which dropped to 26,845,000 barrels, from 30,529,000 barrels in December. Yet, compared with the same period of last year, domestic gasoline consumption increased about two per cent. While exports of gasoline were below the rate of January, 1931, there was an increase over December. January gasoline exports were 3,422,000 barrels, against 2,691,000 barrels in December and 4,903,000 barrels in January, 1931. Production was sharply reduced as a result of lower still runs and also a material drop in the rate of recovery of gasoline from crude. There was a decided tendency toward curtailment of cracking operations in January.

Lubricating Oil Consumption Increases

CONSUMPTION of lubricating oils in January were sharply higher in both domestic and export business. Domestic consumption amounted to 1,512,000 barrels, against 1,366,000 barrels in December. Exports of lubricants rose from 597,000 barrels in December to 616,000 barrels in January. Stocks of lubricating oils were slightly reduced in January and were materially less than a year ago. Stocks on January 31 amounted to 9,478,000 barrels, against 9,511,000 barrels on December 31 and 11,013,000 barrels a year ago.

Pipe Line Motor Fuel Shipments Up

SHIPMENTS of motor fuel through gasoline pipe lines in January increased to 2,123,000 barrels, compared with 1,973,000 barrels in December and only 179,000 barrels in January a year ago. Motor fuel delivered from lines in January amounted to 1,885,000 barrels, against 1,721,000 barrels in December. Stocks of gasoline in lines and working tanks on January 31 amounted to 1,193,000 barrels. There was shortage in both December and January of 7000 barrels between pipe line intake and outgo of gasoline.

Field Operations and Output Lower

PRELIMINARY report of oil field operations and crude oil production for February shows that well completions declined to 884, from 1031 in January,

while daily average crude oil production dropped from 2,190,000 barrels in January to 2,137,300 barrels in February. As a result of the decline in well completions, initial oil production dropped to 3,049,583 barrels, from 3,505,110 barrels in January. Oklahoma and Texas reported the largest production declines; Oklahoma's production declined 25,000 barrels a day, while Texas reported a decline of more than 20,000 barrels. Texas, outside of the Gulf Coast, reported the largest decline in well completions, having dropped from 547 in January to 471 in February.

Production of Liquefied Petroleum Gases Increases

IN increase of nearly 10,500,000 gallons, representing a gain over 1930 sales of 58 per cent, brought the 1931 marketed production of liquefied petroleum gases to a total of 28,502,819 gallons, according to the United States Bureau of Mines, Department of Commerce, following completion of a survey of 1931 operations by E. B. Swanson, chief petroleum economist. The 1931 increase exceeded that recorded for 1930, when marketed production was approximately 8,000,000 gallons higher than in the preceding year.

In two previous surveys, the Bureau of Mines has reported the quantities marketed annually from 1922 to 1930, inclusive, thus giving, with the 1931 survey, a complete record of the marketed production of these gases.

Marketed Production of Liquefied Petroleum Gases, 1922-1931

Year	Gallons
1922	222,641
1923	276,863
1924	376,488
1925	403,674
1926	465,085
1927	1,091,005
1928	4,522,899
1929	9,930,964
1930	18,017,347
1931	28,502,819

An approximate segregation of the gases marketed indicates that the 1931 distribution of propane was about 15,000,000 gallons, as compared with 11,500,000 gallons in 1930 and that the distribution of butane, pentane and the mixtures of these gases more than doubled, being about 13,500,000 gallons in 1931, as compared with 6,500,000 gallons in 1930. Information assembled in the survey shows that shipments made in cylinders and drums totalled approximately 14,000,000 gallons, while bulk shipments were slightly more than 14,500,000 gallons. Bulk shipments were made by tank truck or car and by pipe line. Some portion of these bulk shipments was used by distributors in filling their own cylinders for local distribution.

Marketed production on the Pacific Coast, reported by four companies, totalled 5,056,362 gallons, while the marketed production east of the Rocky Mountains, reported by 10 companies, totalled 23,446,457 gallons.

Segregation of the 1931 marketed production, according to the three principal types of use, showed that 54 per cent was marketed for domestic uses; 24 per cent for industrial and miscellaneous purposes; and 22 per cent for gas manufacturing, either as a raw material for gas manufacture or as an enriching agent.

Segregation by Uses of 1931 Marketed Production

Use	Gallons	Per Cent
Domestic	15,294,648	53.7
Gas Manufacturing	6,184,655	21.7
Industrial and Misc'l	7,023,516	24.6
Total	28,502,819	100.0

It is estimated that approximately 150,000 "bottled gas" customers were

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served during 1931, as compared with 117,000 during 1930, 55,000 in 1929 and 20,000 in 1928. An average consumption of approximately 100 gallons per installation was indicated. Butane, finds its principal market in the industrial fields. Through the American Gas Association, it was learned that 118 communities in 28 states were supplied with liquefied petroleum gas by 59 companies at the close of 1931. Undiluted gas was distributed in 24 communities by seven companies, the remainder being butane-air plants. One butane-air plant was reported operating in Canada. In comparison with installations in operation at the beginning of the year, when 59 plants were reported, an even 100 per cent growth is indicated.

Several companies reported an extension of marketing territory during the year. New developments reported include the employment of liquefied petroleum gases in cotton singeing and the use of liquefied petroleum gas as a fuel and refrigerant for motor trucks designed for the transport of perishable commodities.

Four companies began producing and marketing liquefied petroleum gases during 1931, bringing the total number to 14, one company previously producing having reported no 1931 production.

This list of producers of liquefied petroleum gases was compiled from data submitted to the Bureau of Mines, Department of Commerce, in connection with the 1931 survey of the marketed production of these gases. It includes all producers who have reported operations to the bureau:

Carbide & Carbon Chemicals Corporation, 30 East 42nd Street, New York, N. Y. Trade Name—"Pyrofax." Sale of product started in 1924.

Carter Oil Company, Tulsa, Oklahoma. Sales of product started in 1931.

Hope Construction & Refining Company, 545 William Penn Way, Pittsburgh, Pa. Trade Name—"Hopane," "S-O-Tane," and "Protane." Sales of products started: "Hopane"—January, 1920; "S-O-Tane" and "Protane"—1930.

Lone Star Gas Company, 1915 Wood Street, Dallas, Texas. Trade Name—"Stargas." Sale of product started July 1, 1929.

The Mars Company, Oil City, Pa. Sale of product started May 15, 1928.

Petrolane Limited, (Subsidiary of Lomita Gasoline Co.) Long Beach, California. Sale of product started in 1931.

Philgas Company, (Subsidiary, Phillips Petroleum Company), General Motors Bldg., Detroit, Michigan. Trade Name—"Philgas." Sale of product started in 1927.

Shell Oil Company, Shell Building, San Francisco, California. Trade Name—"Shellane." Sale of product started August 1, 1929.

Shell Petroleum Corporation, 13th and Locust Streets, St. Louis, Missouri. Trade Name—"Shellane." Sale of product started January, 1929.

Skelly Oil Company, El Dorado, Kansas. Trade Name—"Skelgas." Sale of product started May 19, 1928.

The Sloan and Zook Company, Kane, Pennsylvania. Sale of product started about 1916.

Standard Gasoline Company, 225 Bush Street, San Francisco, California. Trade Name—"Flamo," and "Bu-Gas." Sales of products started December 15, 1928.

Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois. Sale of product started in 1931.

Union Oil Company of California, Union Oil Building, Los Angeles, California. Sale of product started in 1931.

Viking Distributing Company, Charleston, West Virginia. Sale of product started in 1931.

The Empire Companies, Bartlesville, Oklahoma. Sale of product started in May, 1931.

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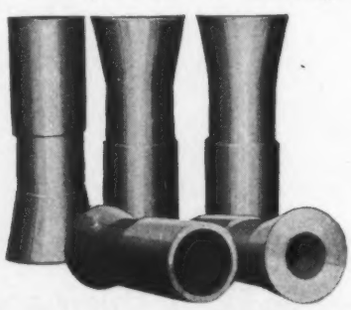

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▼ ASSOCIATION ACTIVITIES ▼

Gasoline Plant Operators Meeting

THE annual Ranger, Texas, district meeting of natural gasoline plant operators, held under the auspices of Natural Gasoline Association of America, is to be held this spring at the American Legion Hall, Ranger, Texas, March 29. Dean Hiatt, Texas Pacific Coal & Oil Company, Harry Wheeldon, Lone Star Gas Company, and E. Buddrus, Phillips Petroleum Company are acting as the program committee arranging the one-day group meeting.

Chemical Society Regional Meeting

THE Midwest regional meeting of the American Chemical Society will be held in St. Louis, Coronado Hotel, May 5, 6,7, at which time the St. Louis section will be host to the visiting chemists. Group meetings will be held all day Friday, and among these groups an important program of papers dealing with petroleum refining will be presented. Dr. L. V. Redmond, president of the society, will address the public meeting Friday night, May 6. The program of the petroleum group follows:

"Entrainment as a Factor in the Design of Fractionating Columns," by Mott Souders, Jr., and Dr. G. G. Brown, University of Michigan.

"Problems in Fractionation," by Prof. D. B. Keyes, University of Illinois.

"The Properties of Hydrocarbon Mixtures at High Temperatures and Pressures," by Dr. W. H. Bahlke, Standard Oil Company (Indiana).

"Cracking Hydrocarbons," by Dr. Gustav Egloff, Universal Oil Products Company.

"Refining Petroleum Distillates," by Dr. J. C. Morrell, Universal Oil Products Company.

"Utilization of Modern Motor Fuels," by Wheeler G. Lovell, General Motors Corporation.

"Research on Petroleum at Penn State," by Dr. F. C. Whitmore.

"Thermal Decomposition of Hydrocarbons," by F. E. Frey, Phillips Petroleum Company.

Prof. W. L. Nelson of the University of Tulsa will also give a paper, subject to be announced later.

Gas Measurement Short Course

THE ninth annual Southwestern Gas Measurement Short Course is to be held at the College of Engineering, University of Oklahoma, Norman, April 26 to 28, according to a recent announcement by W. H. Carson, professor of mechanical engineering and director of the "meter school." The short course is sponsored by the College of Engineering, the Oklahoma Utilities Association and the Corporation Commission of Oklahoma.

W. R. McLaughlin, Arkansas Natural Gas Corporation, Shreveport, is chairman of the program committee. R. D. Turner, Skelly Oil Company, Tulsa, is chairman of the practical methods committee, G. P. Estill, Oklahoma Natural Gas Corporation, is chairman of the committee on publication of papers, and D. C. Williams, Kay County Gas Company, Ponca City, is chairman of the committee on exhibits.

Exhibits are restricted to equipment employed in the Mid-Continent fields and having direct application of gas measurement. Manufacturers wishing to present exhibits should apply to Mr. Williams as early as possible.

A. C. S. Meets At New Orleans

THE Eighty-Third meeting of the American Chemical Society will convene at New Orleans, Louisiana, March 28, completing its work April 1. Unusually low rates have been granted to New Orleans which should foster a large attendance at the spring meeting. The eighty-fourth meeting of this society will be held at Denver, Colorado, August 29 to September 2, 1932.

Stabilization, Economics At A. I. M. E. Meeting

THE need for continued production control in both producing and refining branches of the industry was emphasized by engineers and economists attending the annual meeting of the American Institute of Mining and Metallurgical Engineers, February 15 to 18. Papers covering every phase of the petroleum industry were presented for discussion, with stabilization and economics holding the center of the stage. Prediction was made that East Texas may not be as serious a menace as

The Oil Man's Calendar

MARCH
- 7-8 *Committee D-2, Cleveland, Ohio.*
- 7-11 *American Society for Testing Materials, Cleveland, Ohio.*
- 10 *California Oil & Gas Association, Los Angeles (Annual Banquet).*
- 14-18 *American Chemical Society, New Orleans, Louisiana.*
- 15-17 *American Railway Association, Chicago, Illinois.*
- 23-25 *Michigan Oil Men's Association, Detroit, Michigan (Statler Hotel.)*
- 24-26 *American Association of Petroleum Geologists, Oklahoma City, Oklahoma.*
- 21-27 *Oil Equipment and Engineering Exposition, Los Angeles (Third Annual).*
- 28- 1 *American Chemical Society, New Orleans, Louisiana.*
- 29 *Natural Gasoline Association of America, Ranger, Texas, (plant operators).*

APRIL
- 6-8 *Western Petroleum Refiners Association, Excelsior Springs, Missouri.*
- 2-10 *National Aircraft Show, Detroit, Michigan.*
- 6-8 *American Gas Association, Birmingham, Alabama (Distribution Committee, Technical Section).*
- 11-16 *American Oil Burner Association, Boston, Mass. (Ninth Annual).*
- 14-15 *Southwestern District A.P.I. Division of Production, Tyler, Texas (Spring Meeting).*
- 21-21 *National Petroleum Association, Cleveland, Ohio (Semi-Annual).*
- 22-24 *Petroleum Industry Electrical Association, Dallas, Texas (Baker Hotel).*
- 26-28 *Southwestern Gas Measurement Short Course, Norman, Oklahoma.*
- 27-29 *National Pipe and Supplies Association, White Sulphur Springs, W. Va.*

MAY
- 4- 6 *National Foreign Trade Council, Honolulu, Hawaii.*
- 9-11 *Natural Gas Department, American Gas Association, Tulsa, Oklahoma.*
- 9-13 *National Fire Protection Association, Atlantic City, N. J.*
- 17-19 *Natural Gasoline Association of America, Tulsa, Oklahoma (Mayo Hotel)*

JUNE
- 1- 3 *American Petroleum Institute (Mid-Year Divisional Meetings), Tulsa, Oklahoma (Mayo Hotel).*
- 6- 9 *National Association of Purchasing Agents, Detroit, Michigan.*
- 20-24 *American Society for Testing Materials, Atlantic City, N. J.*

SEPTEMBER
- 14-16 *National Petroleum Association, Atlantic City, N. J. (Annual).*

NOVEMBER
- 15-17 *American Petroleum Institute, Houston, Texas (Annual).*

many believe, since indications point to the possibility of that area passing the flowing stage during 1932. Greater expansion of markets for petroleum products was also pointed out as a definite need for improvement in the refined products situation. Refiners were shown that the trend of gasoline prices followed the course of general business activity and that an upturn in the gasoline market will perhaps not be realized until the curve of general business starts upward.

New officers elected by the Petroleum Division of the Institute include: Scott Turner, director of the United States Bureau of Mines, was elected president of the Institute; and Earl Oliver, of Earl Oliver & Company of Ponca City, Oklahoma, was elected chairman of the Petroleum Division. Hallan N. Marsh of General Petroleum Corporation, Los Angeles, was elected associate chairman; and Professor H. C. George of the University of Oklahoma, at Norman, was elected secretary-treasurer.

The new executive committee includes Earl Oliver, as chairman; C. E. Beecher, chief petroleum engineer of the Empire Companies of Bartlesville, Oklahoma, retiring chairman of the Petroleum Division; E. L. Estabrook, petroleum engineer of Pan American Petroleum and Transport Company, New York; R. S. Knappen, petroleum engineer of Gypsy Oil Company, Tulsa; Dr. J. E. Pogue, consulting engineer of New York; John R. Suman, director of Humble Oil & Refining Company of Houston; T. E. Swigart of Shell Oil Company of California; and Dr. J. E. Umpleby, petroleum engineer of Norman, Oklahoma.

Other officers were elected as follows:

Vice chairman, Production Engineering—E. A. Stephenson, Missouri School of Mines, Rolla, Missouri.

Associate vice chairman, Production Engineering—Carol V. Sidwell, Amerada Petroleum Corporation; L. C. Uren, University of California, and W. V. Vietti, The Texas Company.

Vice chairman for Production—H. J. Wasson, geologist, New York City.

Associate vice chairman for Production—Harry F. Wright, Tulsa, Oklahoma.

Vice chairman for Economics—H. J. Struth, staff economist, The Refiner & Natural Gasoline Manufacturer, Houston, Texas.

Vice chairman for Engineering Research—H. C. Fowler, acting chief engineer, Petroleum and Natural Gas Division, United States Bureau of Mines, Washington, D. C.

Vice chairman for Engineering Education—C. M. Young, professor of mining engineering, University of Kansas.

Vice chairman for Refining Engineering—H. W. Camp, Empire Refineries, Tulsa, Oklahoma.

A. P. I. Refinery Committee Changes

J. W BROWN, Tide Water Oil Company, New York, was recently appointed a member of the American Petroleum Institute's committee on accident prevention in refineries. He succeeds S. W. Candee of the same company, resigned.

Refinery Method Notes On A. P. I. Program

BY way of supplementing the program of the Division of Refining of the American Petroleum Institute mid-year convention at Tulsa, June 1, 2, and 3, Dr. R. P. Anderson, secretary, has invited members of the division to submit brief notes covering "interesting kinks or wrinkles in refinery methods." He states that the program committee

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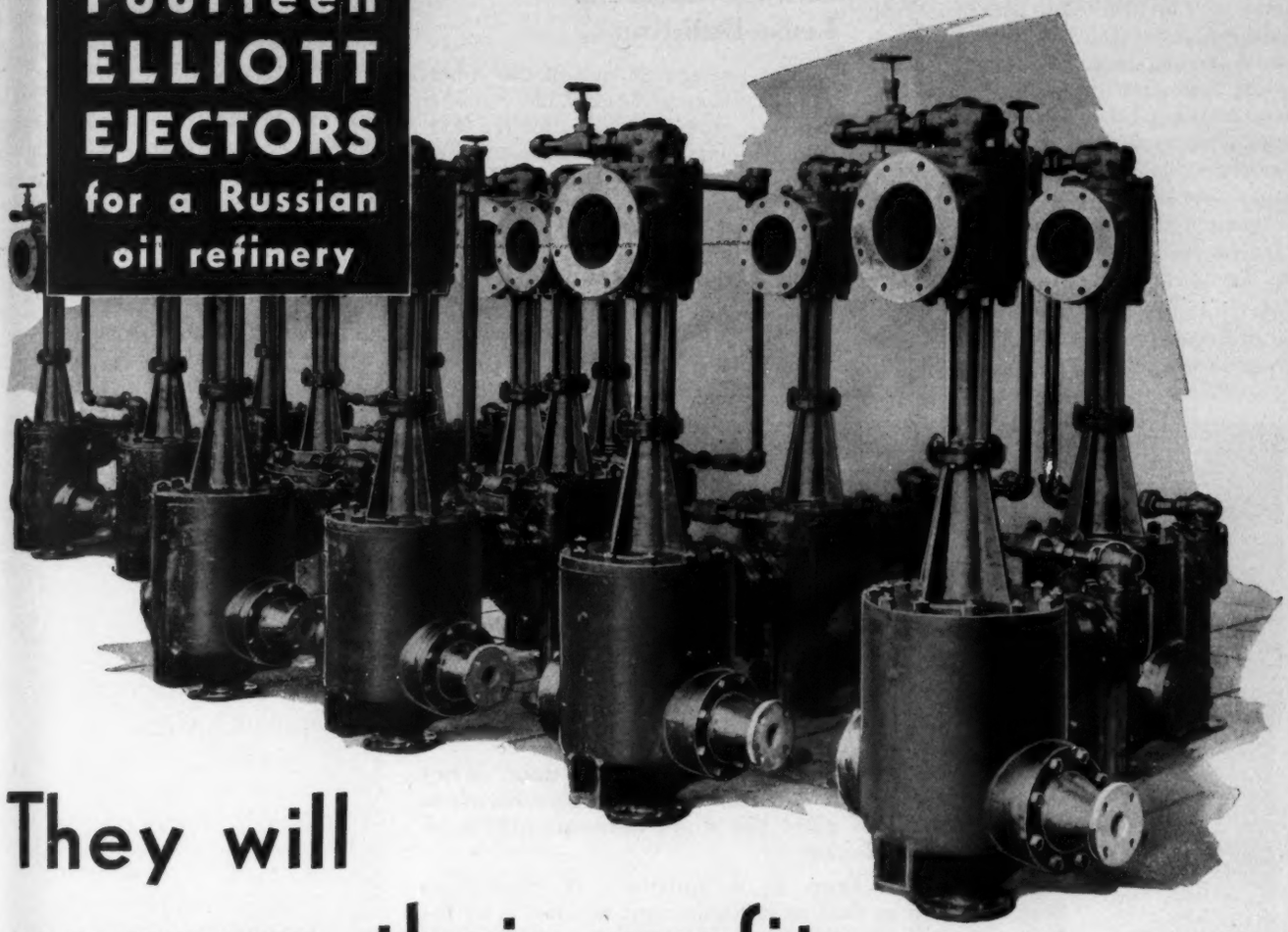

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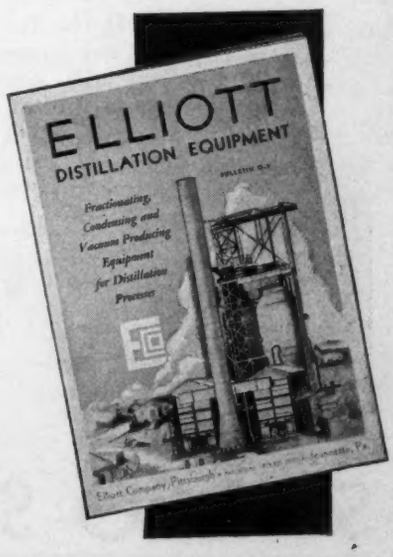
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believes that a limited amount of time may well be devoted to such a feature, and suggests such subjects as inspection of equipment, gaging of cracking stills tubes, and the like. The committee may not be able to find places on the program for all of the good suggestions, but they will choose those that appear of widest interest. It is requested that those who have such a special feature send the description of it as quickly as possible, and before March 15 to Dr. R. P. Anderson, American Petroleum Institute, 250 Park Avenue, New York, N. Y.

Chicago Chemists Lease Building

THE Chicago Section of the American Chemical Society has signed a five-year, renewable lease, for the Midland Building, 176 West Adams Street, one of Chicago's modern office buildings, 22 stories high and centrally located. This is the first step in the proposed establishment of a great chemical center in Chicago. A large proportion of members of the Chicago Section of the society as well as the Chicago Chemical Club, are petroleum chemists employed by Standard Oil Company (Indiana), Shell Petroleum Corporation, and other oil companies. Regular club accommodations will be furnished including dining service and sleeping quarters. Several chemical companies now have their Chicago quarters in the building. Change of name of the building to "The Chemical Center" is contemplated.

W. P. R. A. Meets at Excelsior Springs

WESTERN Petroleum Refiners Association has announced that it will hold its annual convention this year at Excelsior Springs, Missouri, April 6, 7 and 8. One session will be given over to presentation of technical papers, another session is set aside for discussion of general subjects of interest. The convention will close at noon of the third day.

Waste Committee Personal Changes

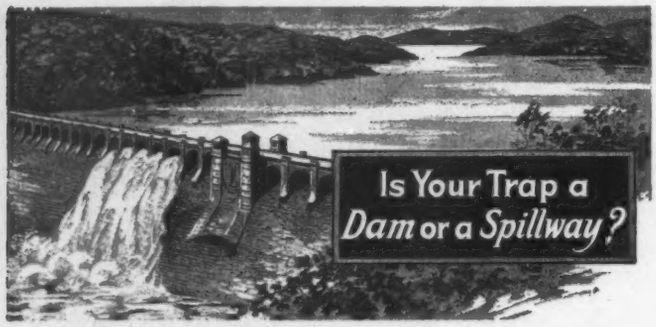
L. MITTELMAN, Associated Oil Company, San Francisco, was recently elected a member of the American Petroleum Institute committee on disposal of refinery wastes. W. S. Nix, Shell Oil Company, Wilmington, California, was elected a member to succeed G. H. van Snedden of the same company, who resigned recently.

Service Testing of Automotive Products

Seven prominent executives and engineers are to discuss various aspects of Service Testing of Automotive Products and Correlation with Laboratory Tests at a joint meeting in Detroit on Monday evening, March 28, under the auspices of the A.S.T.M. Detroit District Committee and the Detroit Chapters of the A.S.S.T. and the S.A.E. This meeting will be held in the Fort Shelby Hotel and will be preceded by a dinner beginning at 6:15 p.m.

This subject of service testing and correlation with testing in the laboratory is of extreme importance to the automotive industry and in fact to every automobile owner. It is evidence of steps the industry is taking to improve the performance of cars.

It can be said that this is the first technical program under the sponsorship of the cooperating societies to be devoted to a discussion of this vital subject. The speakers on the program occupy outstanding positions in their fields and probably no men in the industry are better qualified to speak on the designated subject, or with more authority.



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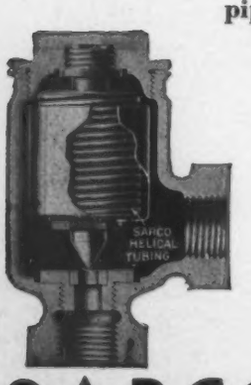

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PERSONALS

Rose Came to Refining Through Sales End

THE newly organized Bobrose Oil and Refineries, Inc., of San Antonio, have been making tank car shipments from its refinery at Luling for the past 90 days and expects to have a refinery at Brownwood in operation sometime during March. These two refineries were formerly the Cranfill-Reynolds plants.

The Luling refinery has a capacity of 5000 barrels of crude oil and is operating on Salt Flat crude. The installation of new units including pipe still and new patented treating process has just been completed under the direction of Robert Rose, the president.

ROBERT ROSE

Mr. Rose is known throughout the oil industry as "Bob." For a number of years he was with General American Tank Car Corporation and later he was in charge of sales of the Southwest for the Deepwater Oil Refineries, Inc. Later he was general sales manager of Grayburg Oil Company of San Antonio. After leaving this company he organized his present company which is chartered under the laws of Texas.

The Brownwood refinery has a capacity of 1500 barrels of crude oil and will operate on Brown County crude.

The company operates a four-inch pipe line system approximately 15 miles in length in Salt Flat field and has a 25-mile pipe line system covering the Brown County field to serve the Brownwood plant. These operations give the company a strong and independent position from the crude supply standpoint.

Sales are being handled by C. W. Watson who formerly was in charge of sales for Grayburg Oil Company of San Antonio, for approximately eight years during the early period of that company's development, and was, up until recently, sales manager for Eggleston Oil Corporation, Corpus Christi. There he rounded out his experience when he was placed in charge of the Eggleston Oil Corporation's export and coastwise movement of oil.

The new company maintains its executive offices in the Alamo National building, San Antonio.

McCammon in Charge of Marathon Refineries

L. B. McCAMMON has been placed in charge of the refining and sales department of Marathon Oil Company, Tulsa (Ohio Oil Company subsidiary). Mr. McCammon has been assistant to W. W. Flemming, president, since the Marathon concern was organized. He was also made vice president of the company at its annual meeting, March 7. H. J. Scott will continue as general sales manager for the company and A. J. Slagter will continue as general superintendent of refineries. The company's plants are located at Boynton and Bristow, Oklahoma, and Fort Worth and Del Rio, Texas.

Elected to Detonation Subcommittee

WILLIAM H. HUBNER, automotive engineer, Universal Oil Products Company, was elected January 27 to membership on the Detonation Subcommittee of the Co-operative Fuel Research Steering Committee. The subcommittee now consists of 17 members representing the American Petroleum Institute, National Automobile Chamber of Commerce, United States Bureau of Mines and the Society of Automotive Engineers.

P. S. Tarbox Dies At Oil City

PHILLIP S. TARBOX, 56, general manager of Independent Refining Company (Quaker State Oil Refining Corporation) Oil City, Pennsylvania, died suddenly in his home, February 17, from a heart attack. For many years Mr. Tarbox was active in the affairs of National Petroleum Association, serving as vice president and trustee at the time of his death. He had been engaged in the refining industry since 1905.

Langer With The Texas Company

THEODORE W. LANGER, after completing his graduate work in physical chemistry at Yale University and receiving his Ph.D., has begun work in the Beacon Research Laboratory of The Texas Company, Beacon, New York.

Arkansas Plant Keeps Chemist Busy

ILO S. DELLINGER, chief chemist for MacMillan Petroleum Corporation in its lubricating oil refinery and asphalt reduction plant at Norphlet, Arkansas, has plenty to do. Analysis of the crude for its lubricating values and analysis of the finished product takes a lot of his time. Directly, he has the

ILO S. DELLINGER

supervision of the laboratory in which a number of chemists are at work each hour of the twenty-four. Indirectly, through the superintendent he is responsible for the quality of the products that are manufactured in the plant. Road oils, asphalt products running the gamut of the industry, lubricating oils made directly from the crude which are turned out in condition for use in the crank case of the automobile without special pretreatment or after treatment consumes the majority of his time.

Graduated from Oberlin College in Westerville, Ohio, in 1923, B. Sc. in chemistry, he did post graduate work at Kansas University in 1924. Immediately thereafter he was associated with Skelly Oil Company at El Dorado, Kansas. From 1925 until 1929 he was in the chemical and analytical laboratory, and during the last 10 months of his

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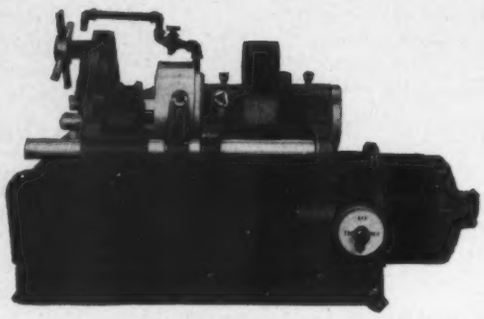

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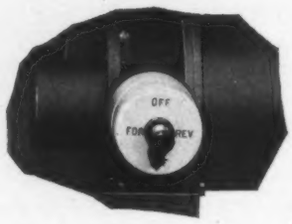

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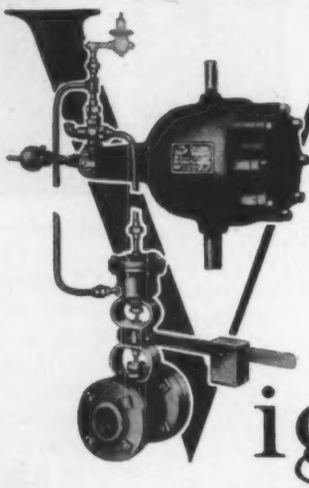

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emplоment there he was chief chemist. In 1929, he went with MacMillan Petroleum Corporation at Eldorado, Arkansas, doing analytical and research work leading up to the installation of the vacuum plant in which the company manufacturers lubricating oil in special equipment.

Oakes Likes to Hunt But No Hunting in Panhandle

BEGINNING his refinery experience with White Eagle Oil Corporation in 1917, John A. Oakes stayed with that plant until 1921 when he accepted a position with the Derby Oil Company which placed him in charge of the cracking units in that plant. Later, he became associated with H. F. Wilcox Oil & Gas Company as refinery superintendent. At this time this company acquired a small plant at Pampa and John was placed in charge.

JOHN A. OAKES

It seems that John is very fond of hunting, birds especially, but as there are no birds in the Panhandle near enough to his plant to enable him to indulge, he only thinks about that sport in lieu of the actual participation. He also admitted that 'golluf' held quite an attraction for him, and during some of his off minutes, which he says are darned few, he sneaks a few sticks over to the course for a while. Ht is somewhat reticent about having a picture taken, and the only way this could be accomplished was to aim the thing at him and say, I'm taking it, so get in position—or take the consequences. He was backed up against a string of tank cars on the plant spur at the time and fortunately in the shade, for Panhandle sunshine plays tricks with a camera at times.

It Took Time—But He Made It

IN all probabilities, when Jack Rayburn went to work as a common laborer for the Rock Island Refining Company in 1924, he had a determination stowed away back in his mind, that some day he would be in charge of the operation of that plant. It took some time and a lot of perserverance, but as things will take place when a man prepares himself, he eventually realized his ambitions.

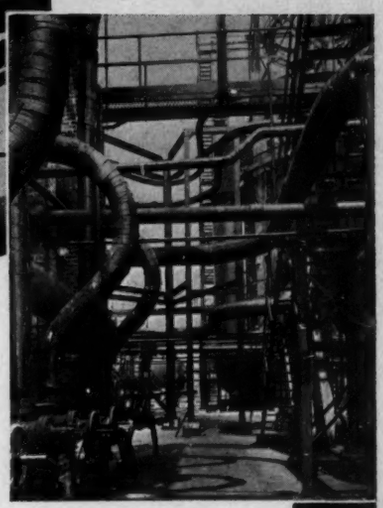
JACK RAYBURN

Two years ago the refinery superintendent resigned and Jack being next in line was promoted to the job. When you talk to him, you will realize why it occurred. He is full of dynamic force. The men in the plant respect his judgment. It's rather hard to get him to stand still even for a minute. When this picture was made, he had an appointment, and did not hesitate to say so—almost had to get him on the run with a high speed lense, but he did finally decided to stop long enough to try a snap which got him. A vacation does not interest him, and so far as hobbies go, a golf stick or a shot gun might as well be a wrench or a pencil. The latest addition to his plant is a complete vapor recovery and stabilization plant together with a treating unit through which the high gravity natural is processed.

Sinclair, Houston Refinery Athletic Association Elects

THE Sinclair Athletic Association, which consists of all employees of the Houston refinery held its annual

FOR REFINERIES



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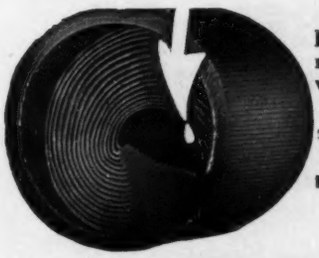

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election of officers at its recent meeting, which is reported to have created more interest and enthusiasm than any previous meeting of the association. Miles A. Joanen, laboratory, was elected president. G. L. Hess, engineer, is vice president; C. E. Hayes of the laboratory, is secretary. The committeemen consist of D. W. Scott, pipe department, J. L. Killen, compounding department, H. A. Clayburn, purification department, F. B. Lacy, stillman, L. J. Porter, electrical department, C. F. Spencer, experimental laboratory, and Fay Woolley, yard foreman.

Shunkey Remembers "Way Back When"

RECALLING old times during the boom at Burkburnett, it developed that Paul Shunkey was employed by Gilliland Oil Company there during 1919, 1920 and 1921. Some of the time during those years he operated a physical test car in that area. Field order books were good for anything from a "trimo" to an automobile. Later after operating the test wagon for some time, Shunkey was given the gas department with territory embraced by Texas, Oklahoma, Arkansas and Louisiana, and remained with that company until its passing. He then went with the Indian Territory Illuminating Oil Company and was in charge of gasoline plants in Seminole until development of the Oklahoma City field began. Transferred to that area when the first plant

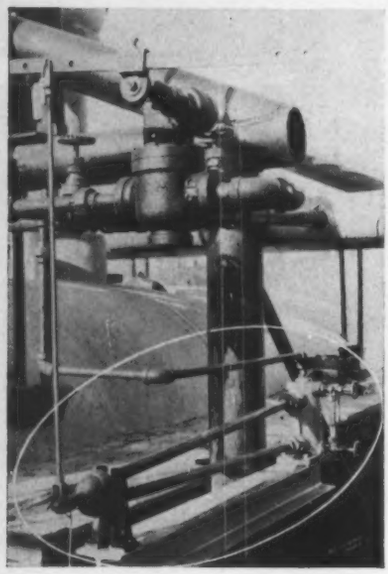
PAUL SHUNKEY

was constructed, he has remained as operating superintendent. The company has seven plants so inter-connected by sufficient pipe lines that excessive loads developed in one area may be switched to other plants running on light volumes of gas.

S. E. BYRD, formerly connected with Kettle Creek Refining Company and Houston Oil Company is now connected with U. S. Oil Refining Company at New Orleans, Louisiana. H. M. Gilbert, formerly superintendent at the Kettle Creek plant is in charge of operation of the U. S. Oil Refining Company plant, and is secretary-treasurer of the company.

Oliver United Filters, Inc.

THROUGH a typographical error the illustrations used in connection with the Filter-Aid Dewaxing Process, published through the courtesy of Oliver United Filters, Inc., and appearing in the Process Number of Refiner & Natural Gasoline Manufacturer, February, 1932, pages 156 and 157, are mislabeled. The underlines of the two processes are transposed and the upper flow chart should read Pressure Filter and Dewaxing Plant, while the lower flow chart legend should read continuous Vacuum Filter-Aid Dewaxing Plant.



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PLANT ACTIVITIES

A REVIEW of the activities in the petroleum refining industry indicates that the anticipated construction of new facilities for the production of high anti-knock value motor fuel is getting well under way. As has been frequently mentioned in these columns during the past few months, 1932 is to see a revival of construction in this industry inasmuch as many refineries are unbalanced as to production of cracked gasoline, or gasoline of high octane rating demanded by the marketing branch of the industry.

A study of the crude charging capacity of most of the large refineries of this country indicates that the production of straight run gasoline is too large and that cracking facilities at most plants are not equal to the task of producing sufficient cracked gasoline to provide blending material in large enough quantities to produce enough high octane number motor fuel. Such plants, and the larger number of American refineries falling in this classification, must enlarge their cracking departments either through utilization of naphtha reforming units or additional gas oil or fuel oil charging cracking units. Some new units under construction take the crude charge direct, skimming and cracking in the same equipment.

These activities are anticipated in all of the refining districts. Reports indicate that at present work is under way or contemplated in the Chicago area, even to the extent of new complete refineries, also enlargement work is proposed in the Ohio district, the New York-New Jersey district, the Gulf Coast district and in California.

Sales of third grade gasoline are not sufficiently large to absorb the surplus straight run gasoline and the new Ethyl Standard of 78 octane number for premium fuels means that additional cracked gasoline must be provided to assist in the absorption of straight run and to reduce the use of lead at least within the range allowed. Present conditions point to no other alternative than erection of cracking or reforming facilities and most of the larger refining companies have recognized the fact and are making plans for the required additional expansion.

Following erection of cracking facilities necessary to care for present conditions, many companies must enlarge their gasoline recovery systems, stabilization systems and steam generating departments, as well as tankage, piping and other auxiliaries. Further, stocks have been unusually low in refinery warehouses and much material must be purchased to replenish such stocks.

The anticipated development work in cracking and reforming involves all of the refining companies possessed of national distribution facilities—or the 20 to 25 largest companies in this country. The same reasoning applies to the larger so-called independents and those smaller concerns who are financially able to install such equipment. The integrated oil company attempting to meet present competitive conditions must manufacture higher octane rating motor fuels.

Considerable activity is under way in foreign countries, especially in France and Russia and with the imposition of a general import duty on petroleum products in England there should be material addition to the expansion of refineries in that country.

Natural gasoline plant activity in East Texas is not fulfilling early forecasts in the number of plants to be erected. Rigid enforcement of proration rules, which restricts every well to a maximum of 75 barrels oil production per 24 hours, necessitates the servicing of many wells to obtain gas volume of any consequence. The net recovery per 1000 cubic feet of gas processed has likewise fallen short of expectations.

Humble Oil & Refining Company has been operating two plants in the Rusk County section of the field for several months. These plants average about six gallons of gasoline per 1000 cubic feet, but when the product is stabilized and properly conditioned for market the net recovery is slightly less than two gallons. This company's plant in the London area is producing an average of 31,000 gallons gross daily, while its smaller plant in the Kilgore area is yielding about 15,000 gallons. During the 10 weeks that a Sunday holiday on crude production was observed in the field these plants were forced into idleness on such days.

Gulf Production Company is scheduled to start operating this month a compression gasoline plant southeast of Overton, Rusk County. This plant is being equipped with six 170 horsepower engines, and will probably have capacity for processing five million cubic feet of gas daily.

In the Gladewater townsite area, Gregg County, the Gladewater Gasoline Company has put into operation a small compression type of natural gasoline plant. Arkansas Fuel Oil Company is expected to complete construction work shortly on a gasoline plant that will serve a large number of leases in the northeast portion of the field. This plant will handle between six and eight million cubic feet of gas daily, if the gas is available, and more than 32 miles of gathering lines, ranging from two to 14-inch, have been installed to assemble this volume of gas.

New Construction

The Bartles-Maguire Oil Company, Milwaukee, Wisconsin, is increasing cracking capacity at its East Chicago, Indiana, refinery through addition of a "controlled coil" type unit designed for operation either as a vapor phase or liquid phase system. The company previously installed a Jenkins cracking unit and a vapor phase cracking unit.

Cia Mexicana de Petroleo "El Aguila" S. A., at its recently completed Mexico City refinery, according to Trade Information Bulletin 784, U. S. Bureau of Foreign and Domestic Commerce, plans to include a second 1000-barrel Gyro vapor phase cracking unit. The first unit of this type in Mexico was erected by the company at its Tampico refinery some time ago.

Commonwealth Oil Refineries, Ltd., plans to modernize its refinery at Laverton, Victoria, Australia, during 1932. This company is owned by the Commonwealth of Australia and Anglo-Persian Oil Company. The refinery operates on Persian crude and uses old horizontal stills purchased from British-Australian Oil Company some time ago. The plant is rated at about 1000 barrels capacity. The company plans installation of new distillation facilities. G. F. McKillop is refineries manager.

U. S. Refining Company, Louis- (New Orleans) Louisiana, is building a 2500-barrel cracking unit after recently conditioning the skimming plant for modern operations. The company took over the old plant of Southport Oil & Refining Company. Headquarters of this company are in the Fort Worth National Bank Bldg. Fort Worth, Texas.

Louisville Refining Company, Louisville, Kentucky is adding a new absorption type gasoline recovery plant and stabilizer. Contracts have been let to Burrell-Mase Engineering Company for equipment and engineering service, and construction will be handled by company engineers.

Compagnie Francaise de Raffinage, of France, 55 per cent of which is owned by Compagnie Francaise de Petroles, French equivalent of the Near East Development Corporation (American) and which are consolidated the French interests in Iraq Petroleum Company, Ltd., will have two 7500-barrel crude distillation units as designed and erected by Arthur G. McKee & Company in association with Schneider et Cie of Paris, France. Plans are now

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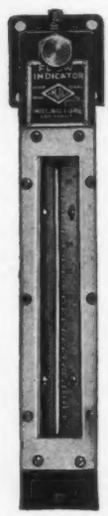

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being drawn. The new plant will be known as the Raffinerie de Normandie, and will be located on the outskirts of Le Harve. It is estimated that the plant will cost approximately $1,000,000, and that the company's construction program, of which this is a part, involves a total of $15,000,000.

Distillazione Italiana Combustibili, S. A., Venice, Italy, has awarded contract for the erection of a single flash pressure distillate re-run unit to be erected at its Mestre (near Venice) refinery, to Arthur G. McKee Company of Cleveland, Ohio. The expansion program at this plant is reported to involve spending about $1,000,000. The new unit will consist of McKee radiant heat type tubular furnace, primary fractionating column and auxiliary equipment. Part of the facilities will be fabricated in Italy, according to contract, but special equipment will be sent from the United States, including such items as automatic temperature, pressure and flow controllers, pumps, exchangers, valves and fittings. Work is to start immediately.

Ecuador Oilfields, (Ltd.), formerly owned by McKay-Harmsworth Oil Exploration, (Ltd.) London, and now controlled by British Control Company, London, England, with a small plant at Salinas, Ecuador, South America, has been planning for some time to modernize the plant through the installation of tube still equipment to replace three old shell stills. This work may be done in 1932.

Empire Oil & Refining Company, is reported to be planning enlargement of its cracking facilities at East Chicago, Indiana, to produce more high anti-knock rating motor fuel.

Estancia Valley Carbon Dioxide Development Company is reported planning construction of a four-ton solid carbon dioxide plant near its Wilcox dome well, Torrence County, New Mexico, six miles from the town of Estancia. The well is said to be capable of producing 240,000 cubic feet of 98 per cent carbon dioxide.

Globe Oil & Refining Company, operating a 6000-barrel refinery at Lemont, Illinois, and equipped with a 3000-barrel Winkler-Koch cracking unit, is reported to be planning construction of an additional cracking unit.

Gulf Refining Company, which acquired the Paragon Refining Company refinery at Toledo, Ohio, about a year ago and rebuilt it, is enlarging the plant further through the addition of six new coking stills, increasing the battery to 14. Ten additional tanks are being erected.

Huasteca Petroleum Company, Standard Oil Company (Indiana) Tampico, Mexico, is reported planning erection of a new cracking unit at the Tampico plant, and not to engage in a large expansion program as was recently reported in the newspapers.

Ohio Oil Company is reported to be negotiating for a 100-acre site on Maumee Bay, near Toledo, Ohio. It is thought a new refinery is contemplated.

Magnolia Petroleum Company is engaged in re-conditioning the cracking units at its original refinery at Fort Worth, Texas. This rehabilitation work also includes the installation of the latest type of furnaces.

Marathon Oil Company has a crew of men dismantling nine of the old cracking units formerly operated at its Bristow, Oklahoma, plant. The company has been drafting plans for modernizing the Bristow plant and the dismantling of the old unit is considered to indicate that such improvements will soon be started and additional modern cracking facilities installed.

Midland Oil Refining Company, Denver, Colorado, is reported to have announced plans for the construction of a topping plant to be located near Denver. The company operates a small plant at Osage, Wyoming. The new plant will have a capacity of 1000 barrels per day.

Northwest Stellarene Company, Coutts, Alberta, Canada, is expanding its facilities for production of cracked gasoline through the erection of a 1200-barrel Dubbs unit. The plant formerly was operated by Beaver Refining Company. The new unit, which replaces the former cracking equipment, will operate on the full flashing system. Hot oil pumps, new reaction chamber, flash chamber and heat interchange equipment is being installed. The plant, which is expected to operate on Kevin-Sunburst (Montana) crude, is to be in operation in May. Bud Vadnais, is superintendent.

The Rotary Process Refining Company, Ltd., Los Angeles, is reported considering erection of a cracking unit at the Vinvale refinery. Three years ago the company installed a new type of cracking process known as "Rotary", but was shut down after operating for a short time, to be converted into a skimming type plant. The refinery has been shut down for some time.

Shell Petroleum Corporation has requested bids for the erection of a vapor recovery plant of the absorption type to be installed at its refinery on the Houston Ship Channel. The proposed plant will provide facilities for the processing of approximately 6,000,000 cubic feet of gas daily, and the recovery is expected to average about six and one-quarter gallons of gasoline per 1000 cubic feet.

San Angelo Refining Company, operators of a 2000-barrel daily capacity skimming plant at San Angelo, Texas, has been sold by W. B. Hassett of Tulsa, C. R. Armstrong of Lock Haven, Pa., and other stockholders to Warner B. Hagan of San Angelo and associates. The owners of this plant will supply its crude requirements from controlled oil held in the Pecos Valley pool, Pecos County, West Texas, using tank cars in making deliveries.

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Shell Petroleum Corporation, at its Houston plant has been clearing ground and setting up forms preparing for the construction of new cracking facilities to be erected this spring. Equipment is moving in this month. Additional work is contemplated this year. (Ref. & N.-G. M., Dec. 1931, page 66-A).

Shell Oil Company of Canada is to make Hamilton, Ontario, headquarters and will erect a 285,000-barrel storage and distributing plant at this point. It is also reported that the company is planning to erect a refinery at Hamilton, although such plans have not been confirmed.

Simrall Refining Company of Canada, 814 Union Central Building, Cincinnati, Ohio, has awarded contract to Foster-Wheeler Corporation for the construction of a skimming plant type of refinery at Amherstburg, Ontario, Canada, which is to cost $200,000. (Ref. & N. G. M., Dec. 1931, page 131).

Sinclair Refining Company, at its East Chicago, Indiana, refinery is mentioned in reports as contemplating construction of additional cracking units to increase production of high octane rating gasoline.

Societe Generale des Huiles de Petrole), subsidiary of Anglo-Persian Oil Company) has started construction of a new refinery at Martigues-Lavera on the Mediterranean Coast of France, which is to be placed in operation early next year, according to current reports.

Standard Oil Company (Indiana) is erecting what is stated to be the world's largest cracking unit at Whiting, Indiana. Rated capacity is 20,000 barrels daily. This unit, now nearing completion, is of the new combination type that skims the crude charge, reforms the heavy naphtha production, subjects the fuel oil to viscosity breaking and cracks the gas oil type charging stock thus produced. The motor fuel streams are combined and stabilized to produce a finished blend of gasoline representing a 70 per cent recovery, having an octane rating of 70. Construction work is being done by M. W. Kellogg Company, New York. Similiar units of smaller capacity are to be erected at the company's Casper, Wyoming; Wood River, Illinois; and Sugar Creek, Missouri, refineries.

The Soviet Union (Russia) plans continued expansion of its refining industry construction program during 1932. At Grozny, in the North Caucasus, one of the largest installations of cracking units in the world is planned. This will consist of 24 cracking units at a reported cost of around $50,000,000, (including auxiliary facilities for the manufacture of asphalt and other products).

During January, 1932, the foundations were laid for a large refinery at Orsk, in the Middle Volga River Region, which is to have a capacity of about 50,000 barrels daily. Estimated cost is $32,000,000. Ultimate plans include laying a pipe line from the Emba fields, on the Caspian Sea to the refinery at Orsk, a distance of 480 miles, and construction of a second refinery at the pipe line terminal to have a capacity of about 25,000 barrels of crude daily. Cracking units now in service in Russia are reported as Jenkins, Winkler-Koch, Vickers (British built), Pintsch (German built) and the Russian built and designed Shukhoff and Kapelushnikoff units. The lubricating oil refining capacity at Baku amounts to approximately 5,700,000 barrels annually and it is planed to increase this by 3,500,000 barrels during 1932.

Texas Pacific Coal & Oil Company is installing two additional fractionating columns at Fort Worth, Texas, improving preheater system and enlarging water supply, involving an expenditure of about $30,000. Work is to be completed in March.

Tide Water Oil Company is increasing cracking capacity through the addition of a 7000-barrel Tube and Tank unit, which will increase total cracking capacity to about 22,000 barrels daily at its Bayonne, New Jersey, refinery.

Waggoner Refining Company, Inc., is shutting down its Electra, Texas, refinery for one month during which time reconditioning changes will be made to complete a program of expansion started some time ago. The plant capacity is 3500 barrels daily. Sufficient refined products are reported on hand to take care of requirements of its customers during the shut-down.

Yale Oil Corporation of South Dakota is reported planning the installation of a lubricating oil plant to be operated in conjunction with its 3000-barrel refinery at Billings, Montana.

Walter K. Campbell and Associates, Wichita Falls, plans to erect a 300-barrel skimming plant in the Los Olmos pool, Starr County, Texas, after having contracted for oil production in that field.

▼ Operating ▼

East Texas Refining Company has completed construction of a new cracking unit at its Longview, Texas, refinery. This unit was erected by the company with Petroleum Engineering Service, (Geppelt and Peairs) Dallas, as consultants.

Naph-Sol Refining Company, Muskegon, Michigan, has resumed operations after being shut down because of plant fire with estimated damage of $12,000. A new double pipe still has been completed. A new 500-barrel shell still has been ordered and will be erected soon. A 500-barrel agitator and about 10,000 barrels additional storage, and other equipment, has been added to the plant recently. After the recent expansion the plant has a rated capacity of 1500 barrels per day.

Octane Refining Company, has completed construction of its 1200-barrel skimming plant at Chautauqua, about three miles from Baird, Callahan County, Texas, and starts operating this month. The plant is located on the Texas & Pacific Railroad. Woodley Petroleum Company, Shreveport, the parent company, controls about 700 barrels of settled production in this area and will buy local production to fill requirements. G. R. Gaysinger, formerly with Lion Oil Refining Company, El Dorado, Arkansas, is in charge of the plant. (Ref. & N. G. M., Vol. 10. No. 11, Nov., 1931, page 148).

Sterling Refining Company, Oklahoma City, Oklahoma, has been organized by W. G. Johnson, B. F. Green, and L. W. Pratt and construction work has been completed with intentions to begin operation early in March. The individuals interested in this company are officers of Gulf States Oil Corporation and White Oak Corporation. The plant has a rated capacity of 2000 barrels daily.

Sterling Oil Refineries, Ltd., has completed construction and is operating its 2000-barrel refinery at Moose Jaw, Saskatchewan, Canada. The plant is a combination topping and cracking unit. L. D. Ohm is president and general manager. Hal Berry and S. A. Hamilton are vice presidents; James Kennedy is secretary and treasurer and Don J. Baize is in charge of the refinery operations. (Ref. & N. G. M., August, 1931, page 132, Sept., 1931, page 120).

The Sherwood Refining Company, subsidiary of Sherwood Petroleum Company, Inc., Bush Terminal Building, No. 1., Brooklyn, N. Y., is now operating the refinery of Mutual Refining Company, at Warren, Pennsylvania. The Mutual plant was acquired by Superior Oil Works, Warren, in 1930, but was shut down in 1931. The plant has a capacity of about 1000 barrels daily. It will specialize in the production of medicinal and technical white mineral oils and petrolatum. Since the imports of Russian medicinal mineral oils must pay a duty of 25 cents after March 11, the manufacture of such oil in this country is given impetus.

▼ Changes ▼

Portland Associates, Inc., has been incorporated in Wyoming, as a producing refining and transportation organization. Reports state that the company has acquired the refinery of Bighorn Oil & Refining Company at Billings, Montana, and will recondition it to operate at the rate of 1000 barrels per day.

Major Oil & Refining Company has made application for charter in Oklahoma, and is to take over the plant of Crump Refineries, located north of the Oklahoma City field. W. U. Paul of Oklahoma City and C. H. Fox of Bristow, Oklahoma, are the organizers of the company. The plant, erected by Crump, was never operated. Capacity is 2500 barrels per day.

The Sebree, Webster County, Kentucky, refinery is being moved from Seebree to Greenville, Muhlenberg County, Kentucky, and is to be placed in operation in a few weeks. The new location was secured from Hugh Lee, three miles south of Greenville. Crude produced on the Lee farm will be processed at the rate of about 100 barrels per day. H. E. Eaves, H. E. Eavers, Jr., B. L. Andrews, and G. L. Hill are interested in the new plant. Reports state the new company will be The Greenville Refining Company, Inc.

Sullivan Refineries, Inc., Daytown, N. M., erected in 1926, has been sold at a foreclosure sale recently at Artesia, N. M., to J. H. Jackson, attorney, acting for Sherwin-Williams Company and R. A. Shugart, for $3500. It is reported that the plant will be dismantled.

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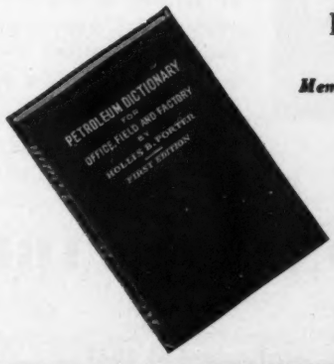

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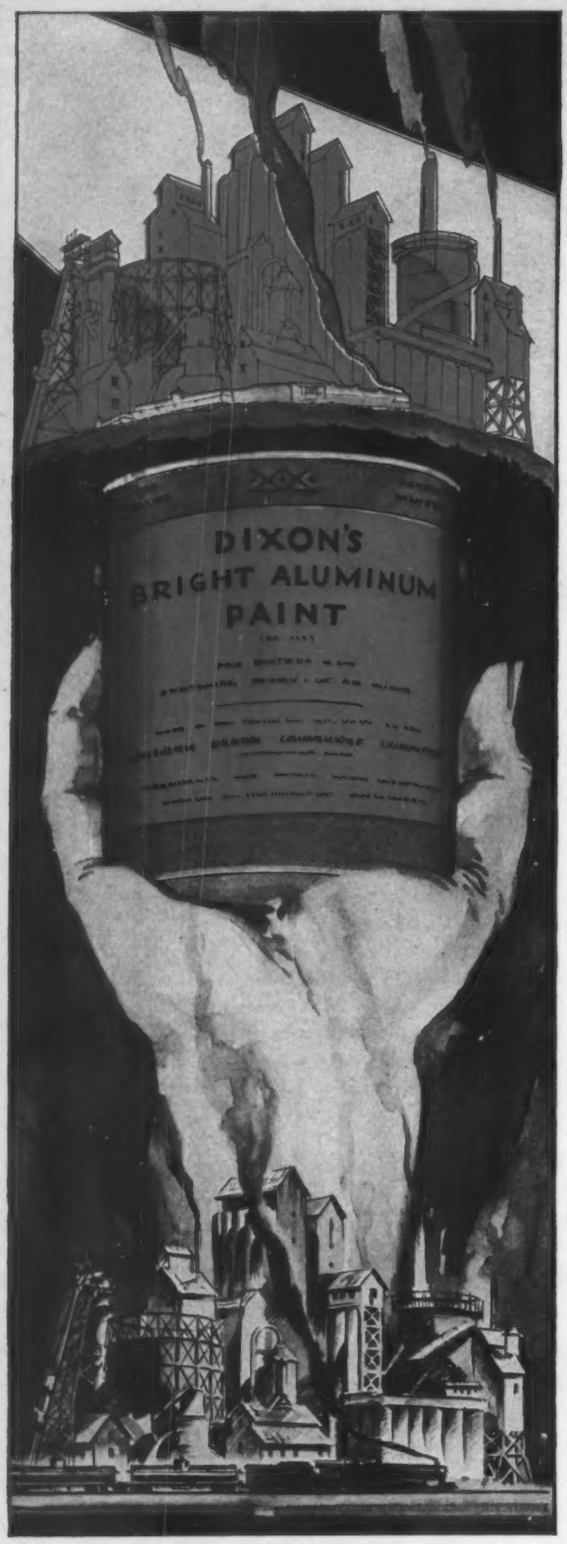

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FUNDAMENTAL PHYSICAL DATA

Thermal Data on Organic Compounds: Further Studies on the Heat Capacities, Entropies, and Free Energies of Hydrocarbons. H. M. HUFFMAN, G. S. PARKS and MARK BARMORE. *Jour. Am. Chem. Soc.* **53** (1931) pp. 3876-88.

This is a report of continuation of earlier work on the hydrocarbons along the same line and includes data on 20 hydrocarbons.

The Total Heat and Specific Heat of a Series of Petroleum Oils, and their Relation to Other Properties. H. R. LANG and R. JESSEL. *J. Inst. Pet. Tech.* **17** (1931) pp. 572-6.

The preparation of the samples used is described and determinations of mean molecular weights and other properties given. The temperature range covered was 0°C. to 100°C.

Specific Heat of Some Crude Oils and Their Residues when Topped to 100°C. (212°F.). H. R. LANG. *J. Inst. Pet. Tech.* 17 (1931) 585-91.

The deviation between sp. heat—temperature curves for samples of topped and untopped crude is attributed to presence of dissolved air and gas in the crude. The Conradson carbon residue is indirectly proportioned to the specific heat.

The General Theory of Boiling Point Rules. T. S. WHEELER. *Phil Mag.* 12 (1931) pp. 685-9.

The various boiling point rules are deduced mathematically from a single equation.

Dew Points of Paraffin Hydrocarbons. KARL HACKMUTH. *Ind. Eng. Chem.* 24 (1932) pp. 82-5.

The dew points were determined either by measuring the contraction of the vapor as the temperature was lowered at constant pressure, or by measuring the contraction in volume with increase in pressure at constant temperature. The latter method is preferred because of easier manipulation. The experimental values check well with dew points calculated by means of Raoult's law. An empirical method of calculation is given for three-component systems, the results from the use of which check experimental values closely.

Thermodynamics of Difference between Gross and Net Heating Values, Solid and Liquid Fuels. L. C. LICHTY and B. L. BROWN. *Ind. Eng. Chem.* 23. (1931) pp. 1419-21.

The difference between the gross and net heating values of a fuel burned at constant atmospheric pressure is equal to the weight of water condensed multiplied by the latest heat of steam at the temperature to which the combustion products are cooled. For various combinations of fuel, temperature, and humidity of air this difference can be anything from 0 to 1070 B.t.u. per pound. The thermodynamics of the difference between gross and net heating values is discussed. Differences have been computed for the constant volume bomb determinations, and a mean value of 970 B.t.u. per pound of water vapor is suggested. It may be noted that the present A.S.T.M. value is 1040.

Solubility of Water in Aviation Gasolines. E. W. ALDRICH. *Ind. Eng. Chem., Anal. Ed.* **3** (1931) p. 349.

The gasoline was saturated with water at the particular temperature and an alloy of sodium and potassium added after removal of dissolved gases. The hydrogen evolved was collected and measured.

CHEMICAL COMPOSITION AND REACTIONS

Isolation and Determination of the Cyclohexane in a Mid-Continent Petroleum. J. H. BRUNN and M. M. HICKS-BRUNN. *Bur. Stds. Jour. Research* 7 (1931) pp. 607-15.

Mid-Continent crude was fractionated in 1°C. cuts and the fraction from 74°C. to 85°C. nitrated to remove benzine. The treated material was re-fractionated and the 80.0° to 80.5°C. cut subjected to fractional melting. This yielded a pure product (99.96 mol. %). The physical properties of this substance were determined and found to agree with data on synthetic cyclohexane. Photographs of the visible, ultra-violet, and infra-red absorption spectra were taken. The 80.0 to 80.5°C. fraction contained 94 mol. % of cyclohexane, or 0.33% based on the crude.

Isolation of Normal Nonane from a Mid-Continent Petroleum. J. D WHITE and F. W. ROSE, JR. *Bur. Stds. Jour. Research* 7 (1931) p. 907.

Normal nonane was separated from Mid-Continent petroleum by fractional distillation followed by fractional fusion of a close boiling fraction. The properties compare closely with those of synthetic normal nonane. The crude petroleum contained approximately one per cent of normal nonane.

Dehydrogenation Catalysis as a Method of Investigating the Hydrocarbons of Petroleum. N. D. ZELINSKI and B. A. KAZANSKI. *Ber.* **64B** (1931) pp. 2265-70.

The method of catalytic dehydrogenation, previously used by Z. and his co-workers in studying fractions boiling under 150°C. was applied to fractions of Baku petroleum boiling between 170-200°C. The catalyst used was platinized charcoal at a temperature of 300-310°C. The results show that the fraction studied consisted largely of cyclo-pentane derivatives that were not dehydrogenated.

Identification of Diolefins in Lower Fractions from Vapor-Phase Cracked

Gasoline. S. R. BIRCH and W. D. SCOTT. *Ind. Eng. Chem.* **24** (1932) pp. 49-50.

The diolefins can be identified by use of their reaction with maleic anhydride. The addition products are crystalline and readily characterized. Butadiene, piperylene, isoprene, and cyclopentadiene were found in the low boiling fractions of a vapor-phase cracked gasoline. The reaction between the cylic di-olefins and maleic anhydride is rapid but that with the straight-chain olefins is much slower.

Sulfur Compounds in Cracked Distillates. A. DUDENKO. *Azerbaidzhanskoe Neftyanoe Khozyeistro,* (1931) No. 6, pp. 42-4.

Vickers pressure distillate, boiling range 40°C. to 231°C. and sp. gr. 0.788, contained 0.005% elementary sulfur, 0.01% hydrogen sulfide, 0.004% mercaptans, 0.006% dialkyl disulfides, 0.003% di-alkyl sulfides, and 0.038 other sulfur compounds. The sulfur content decreased from 0.064% in the most volatile fraction to 0.059% in the highest-boiling fraction.

Chemical Utilization of Natural and Refinery Gases. K. FROLICH and P. J. WIEZEVICH. *Ind. Eng. Chem.* **24** (1932) pp. 13-17.

The hydrocarbons of natural gas can be cracked, oxidized, or halogenated. Refinery gases, containing unsaturated hydrocarbons, can be treated by these methods or by addition and polymerization. The most important application of cracking is in the manufacture of carbon black of which one million pounds is made annually. Methane can be cracked quantitatively to acetylene in the electric arc. The thermal reaction of propane and butanes are reviewed. Low pressure oxidation is not yet in commercial use. High pressure oxidation gives more hopeful results, for example, propane yields methanol, ethyl alcohol, acetaldehyde, acetone and formic acid. Hydrogen is now commercially made by the oxidation of methane by water followed by the oxidation by water of the carbon monoxide produced in the first reaction. This hydrogen is used in the hydrogenation of petroleum oils. Halogenation has been used commercially to a limited extent in the chlorination of pentane to produce amyl alcohol. Addition of chlorine, HCl, or hypochlorous acid to olefins are readily effected. Ethylene glycol is now made commercially in this manner. Addition of water to olefins at high pressure has not proved successful. However, by the hydrolysis of the sulfuric acid addition product, alcohols are readily made. This process is the commercial source of a large quantity of isopropyl and higher secondary alcohols. Propyl acetate is made commercially by treating propyl acid sulfate with calcium acetate. Acetaldehyde, acetic acid, and acetic anhydride are produced from acetylene. Polymerization of olefins to liquid hydrocarbons proceeds to best advantage at moderate temperature and under pressure. Yields as high as 10 gallons of liquid product per 1000 cu. ft. of the original propane used to make the olefins have been obtained. Cost and market conditions have prevented the use of such procedures. Polymerization of olefins by aluminum chlorides yields lubricating oils. Polymerization of olefins to diolefins followed by polymerization of the diolefins is a potential source of rubber and other amorphous solids. A bibliography of 38 references is appended.

Mechanism of the Formation of Aromatics from Lower Paraffins. V. SCHNEIDER and PER K. FROLICH. *Ind. Eng. Chem.* **23** (1931) pp. 1405-10.

The authors studied the mechanism of the thermal reactions of propane, propylene, ethylene, and butadiene in an effort to determine the course of the reactions. The method used was an ingenious one involving the plotting of mols of products against mol per cent of the particular hydrocarbon reacting and extrapolating

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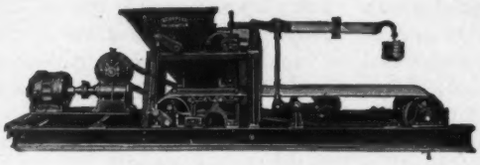

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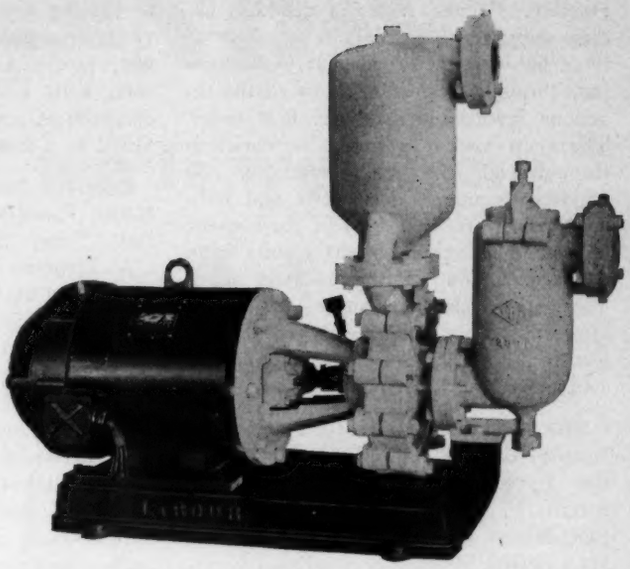

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the curves so obtained to zero per cent reacting. Primary reaction products are thus shown as some definite numbers of mols but curves for secondary products pass through the origin. Most of the reactions involved are of the first order. The main road to aromatic formation is through ethylene and butadiene, the ethylene coming both directly and indirectly from propane. Part of the benzene is formed directly and part results from dehydrogenation of the triolefin C_6H_8. The paper constitutes an important and interesting contribution to the general subject of the mechanism of the thermal reactions of hydrocarbons.

The Production of Motor Fuels from Natural Gas. I. Preliminary Report on the Pyrolysis of Methane. H. M. SMITH, P. GRANDONE, and H. T. RALL. *Bur. Mines, Rept. of Investigations, No.* **3143** (1931) 12 p.

The products obtained by the thermal treatment of methane are given and the effect of dilution with nitrogen, hydrogen, and ethane described.

Thermatomic Process for Cracking of Gaseous Hydrocarbons. R. L. MOORE. *Ind. Eng. Chem.* **24** (1932) pp. 21-3.

Methane is decomposed in a checkerwork furnace in the operation of which heating and cracking periods alternate. The temperature in the furnace ranges from 900°C. to 1400°C. In a recent modification of the "soft" carbon process the reaction gas is recirculated thus causing the decomposition to occur in a dilute atmosphere and reducing the size of the carbon particles to one-fifth that previously secured. The advantages to be derived from the use of this fine carbon in making rubber compounds are discussed. The by-product gas is 85% hydrogen, 6% nitrogen, 5% methane, 1.3% illuminants, and 2.0% carbon monoxide and dioxide. A bibliography of 23 references is appended.

Conversion of Methane to Carbon Monoxide & Hydrogen. C. O. HAWK, P. L. GOLDEN, H. H. STORCH, and A. C. FIELDNER. *Ind. Eng. Chem.* **24** (1932) pp. 23-7.

A cyclic process is described for converting methane, or gases containing methane, into carbon monoxide and hydrogen by treatment with water or with carbon dioxide. The heat of reaction is supplied by heating the catalyst bed with an air-gas flame. The catalysts stand the conditions well and the yields are near the calculated equilibrium values. The best range of temperature is 900° to 1100°C. A bibliography of eight references is given.

Ethylene as a Possible Source of Liquid Fuel. G. T. MORGAN, H. INGLESON, and R. TAYLOR. *Pet. Times* **24** (1931) p. 1024.

Commercial ethylene was polymerized by passing it through a copper-lined converter one-half inch in diameter at a temperature of 450°C. and at 70 atm. pressure, both with and without basic zinc chromite as a catalyst. The product was tested as a motor fuel.

Catalytic Decomposition of Kerosene. E. W. KANNING and O. W. BROWN. *J. Phys. Chem.* **35** (1931) pp. 2689-2710.

A kerosene fraction boiling between 392°F. and 446°F. was cracked in passage over cobalt, iron, manganese, and nickel catalysts. The effect of temperature change on the amount and composition of gas was studied. The quantity, sp. gr., and unsaturation of the liquid products were determined. Deposition of carbon on the catalyst at low temperature rendered the catalyst less active. At higher temperatures it had little effect. Increase in temperature resulted in increased decomposition. In order of activity in decomposing kerosene the catalysts are: cobalt, iron, nickel, and manganese. Nickel only gave appreciable percentages of unsaturateds in the gas. Nickel gave the gas having the highest percentage (46.4) of methanes. Iron gave the gas having the highest percentage (90.5) of hydrogen. Manganese and nickel favored the formation of gaseous paraffins of higher molecular weight than methane.

Thermal Behavior of Sulfur Compounds in Hydrocarbon Solvents: A. Aliphatic Mercaptans. W. M. MALISOFF and E. M. MARKS. *Ind. Eng. Chem.* **23** (1931) pp. 1114-20.

Seven mercaptans were studied at 300° C., 425°C., and 475°C., at several concentrations in benzene, n-heptane, 2.2.4. trimethyl-pentane and straight run naphthas. The decomposition of the aliphatic mercaptans is homogeneous in the gas phase up to 475°C. Hydrogen sulfide and an olefin are formed. An approximation of the temperature coefficient of the reaction of n-amyl mercaptan indicates a value of 1.38 for 10°C. intervals and a heat of activation of 33,500 cals. The value of E/RT for a velocity constant of 0.00158 sec^{-1} is estimated as 24.7.

MANUFACTURE, PROCESSES AND PLANT

"Petroleum Development and Technology, 1931." Transactions of the Petroleum Division of the American Institute of Mining and Metallurgical Engineers.

Reprint in book form of papers presented before the Petroleum Division in Oct. 1930 and February 1931. 657 pp. Published by Am. Inst. Mining & Met. Engrs., 29 W. 39th St., New York City. Price $5.00. This annual survey includes papers covering the general subjects of Unit Operation, Production Engineering, Engineering Research, Economics, and Refining. Each section is introduced with a summary of the progress made during the year. Papers are written by men of the highest standing in their fields of work and in total constitute an excellent report on the advancement of the industry.

Distillation. W. K. LEWIS. *Ind. Eng. Chem.* **24** (1932) pp. 89-91.

A description of the mechanism of simple distillation and rectification and a comparison of the effectiveness of laboratory and plant equipment. The wider use of laboratory vacuum rectification is advocated because of the ease of separation under low pressure.

Heat Transfer Calculations. O. A. SAUNDERS. *Trans. Institution of Chem. Engrs.* **8** (1930) pp. 209-13.

A method of correlation of existing data on heat transfer by convection is given. A curve is presented showing the relationship of two dimensionless fractions by use of which the transfer of heat from cylindrical bodies of any size can be determined. The heat transfer between a gas and a tube with the gas flowing under forced convection is also analyzed. The analysis of these heat transfer phenomena is applied to the case of hot gas flowing through a tube with exterior heat loss by natural convection with the tube both bare and insulated.

CHEMICAL TREATMENT

Removal of Weak Organic Acids from Oils by Treatment with Caustic Alkali. P. MEYER. *Jour. Inst. Pet. Tech* **17** (1931) pp. 621-9.

Experiment and calculation show that the more dilute solution of alkali removes the larger amount of such acidic substances as mercaptans and phenols. Complete removal can be effected in practice by counter current washing.

ADSORPTIVE REFINING

Physicochemical Properties of Japanese Acid Clay. VI. X-Ray Studies on Japanese Acid Clay. K. YAMAMOTO. *J. Soc. Chem. Ind. Japan* **34** (1931) Suppl. binding, pp. 244-7.

Japanese acid clay is considered to have the composition $Al_2O_3.6\ SiO_2.XH_2O$ and to be a mixture of colloidal hydrated aluminum silicate and colloidal silica. X-ray photographs were taken of numerous Japanese and foreign clays and minerals. English fullers earth and German acid clay give the same diffraction lines as the Japanese clay. Florida earth gives a weak pattern. X-ray spectral lines of alkali treated acid clay are the same as the untreated clay up to 20% concentration, but those of 30% NaOH treated clay are different. Acid treated clay heated to 600°C. gives the same patterns as the original, slightly modified lines if heated

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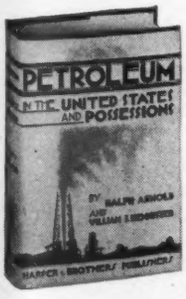

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to 900°C., and entirely different lines if heated to 1000°C.

X-Ray Studies on Acidic Clay. I. 1. Observations with X-rays on Various Samples of Acidic Clay. 2. Crystal Structure of Acidic Clay. H. ISOBE and T. WATANABE. *J. Chem. Soc. Japan* **51** (1931) pp. 10-4.

Several Japanese acidic clays upon X-ray examination showed the same spectra, that is, the same crystal form. Dry and wet samples showed the same spectra, so hydration does not effect crystal form. The magnitude of the clay particle is 10^{-6} cm. the clay dried at 1000°C. belongs to the quadratic crystal system and a unit crystal contains four molecules of $(SiO_2)_6 Al_2O_3$.

WAX REMOVAL AND PROCESSING

Removing Paraffin from Paraffin-Containing Lubricating Oil Distillates by Distillation. E. PYHALA. *Erdol und Teer* **7**, Oct. 5, 1931, p. 446.

The process described is used to handle oils containing very low melting paraffins.

New Processes for Removing Paraffins from Oils. WALTHER. *Erdol und Teer* **7**, Oct. 5, 1931. p. 446-7.

The patents granted in the last year or more on removing wax from petroleum oils are briefly reviewed.

Paraffin Concentrating Plants. E. A. VON *Groeling. Petrol. Ztschr.* **27**, Jan. 28, 1931. pp. 75-83.

The redistillation, acid treatment, cooling, sweating, and filtering of wax are discussed.

Apparatus for Wax Sweating. H. L. ALLAN. *Jour. Inst. Pet. Tech.* **17** (1931) p. 657.

Claims that sweating was first used by Hodges in 1871, who heated pressed cakes of wax. Discusses and criticizes the conventional sweat pans. Describes an apparatus devised by Allan and Moore, four of which do the work of 13 to 15 conventional sweating ovens.

MATERIALS, FABRICATION, CORROSION

"Creep of Metals." H. J. TAPSELL. *Book 285 pages. Oxford University Press. London*: HUMPHREY MILFORD, 1931. *Price* 21s. net.

A critical review of the entire subject of creep. The subject matter includes a discussion of the short-time tensile test, the theory of overstrain and creep, creep curves and the factors influencing them, measurement of creep, limiting creep stress, stress limits for given creep and no creep, influences modifying creep, creep in relation to other mechanical properties, and creep properties of ferous and non-ferrous metals and alloys.

Industrial Steels and Alloys—Recent Developments. II. Steels, Alloys, and Cast Irons for Heat Resistance. J. W. DONALDSON, *Chem. and Ind.* **50** (1931) pp. 838-45.

Ways of Proving a Good Weld. T. R. WATTS. *Elect. World* **98** (1931) pp. 645-8.

Four methods can be used: (1) Closely watching trained operators, (2) hammer and stethoscope tests, (3) Gamma-ray photographs (surpasses X-ray), and, (4) Magnetic method. The Sperry electromagnetic method is described. A weld test meter is being developed and perfected, the use of which will not be influenced by the depth at which the flow exists. The approximate efficiency of the weld can be determined. The weld test meter is best used in conjunction with the electromagnetic test, as they are supplementary.

Corrosion and Protection of Steel against Corrosion. *E. H. SCHULZ. Proc. World Eng. Congress, Toyko,* 1929 **34** (1931) pp. 179-94.

A discussion of the most important factors governing corrosion of steel. The addition of 0.25 to 0.35% copper prolongs the life of structural steel materially. Other elements increase its corrosion resistance under water.

PETROLEUM PRODUCTS, PROPERTIES AND UTILIZATION

Compulsory Adulteration of Motor Fuel. WM. RUSSELL. *World Petroleum,* **2**. (1931) pp. 328-9. Adulteration of motor fuel with ethyl alcohol is compulsory in Germany, France, Sweden, Hungary, Italy, and Latvia, and similar legislation is probable in Austria, Poland, Czechoslovakia, Brazil, Cuba, and Salvador.

The Present Position of Knock-Testing Standardization. Standard Fuels. C. H. BARTON. *Jour. Inst. Pet. Tech.,* **17**, (1931) pp. 468-71.

Issoctane or 2-2-4 trimethyl-pentane is to be preferred to benzene as a standard fuel because (1) octane-fuel blends are less sensitive to a rise in engine temperature than benzene-fuel blends, (2) more octane is required in the blends and there is less chance of error, (3) pre-ignition is less likely.

Methods of Tests and Precautions to be Observed. R. STANSFIELD. *Jour. Inst. Pet. Tech.* **17** (1931) pp. 476-84.

The final form in which the bouncing-pin indicator of knock intensity will be adapted to the C. F. R. engine will be available soon. A modification of Huf's sound intensity method has been found as sensitive as the bouncing-pin by the Knock-Rating Sub-Comm. of the Institution of Petroleum Technologists. It should prove useful for testing multi-cylinder engines and for study of knocking of low intensity. It will be necessary to standardize inlet-air temperature and to hold engine speed constant.

Photographic Method of Determining the Resistance of Gasoline to Detonation. M. AUBERT and R. DUCHENE. *Compt. Rend.* 192 (1931) pp. 1633-5.

Photographs were taken showing the propagation of flame through a fuel-air mixture under 7:1 compression. The temperature was raised until the propagation of the flame was instantaneous. This temperature is taken as an index of the detonation characteristic of the fuel and is in agreement with engine tests.

Rationale of the Movement of Flame Through Explosive Mixtures of Gases: I. Explosions in Closed Containers. O. C. de C. ELLIS *Jour. Soc. Chem. Ind.* **50** (1931) 403T-9T.

A discussion, illustrated with photographs, of the combustion phenomena observed when gaseous mixtures are ignited in spherical and non-spherical containers, at one point symmetrically positioned, and at more than one point. The effect of turbulence is discussed.

Oxidation and Ignition of Gaseous Mixtures. M. PRETTRE. *Ann. des Comb. Liquides* **6** (1931) pp. 7-42, 269-309, 533-58.

An apparatus is used, based on the "pyrometer" method, for accurately determining the ignition temperatures of inflammable gaseous mixtures. Mixtures of hydrogen and air, hydrogen and oxygen with different preparations of nitrogen, argon, and carbon dioxide, carbon monoxide and air, and carbon disulfide and air were studied. The phenomena of luminosity preceding ignition were studied in detail. The results explain the low ignition temperatures obtained by those methods of study that involve a slow progressive heating of the mixture. What the author terms first ignition occurs in many mixtures, notably paraffins hydrocarbon-air mixtures at a temperature 30-40°C. above the temperature of luminosity. This first ignition is suppressed by anti-detonants such as benzene or tetraethyl lead, thus enabling combustion to take place in the normal manner and at normal temperature. The article includes an historical review and extensive bibliography.

Determination of Olefine, Aromatic, and Paraffin Hydrocarbons in Neutral Oil from Coal Tar. E. B. KEATES and W. D. POHLE. *Ind. Eng. Chem., Anal Ed.* **3** (1931) p. 295.

A method of analysis of possible application to cracked gasoline on pressure distillate is described.

Improved Paraffin Base Lubricating Oils. G. H. B. DAVIS and A. J. BLACK-

WOOD. *Ind. Eng. Chem.* **23** (1931) pp. 1452-8.

The authors point out that it would appear from the trend in the trade that low pour point is rapidly coming to be regarded as synonomous with high-quality. They then present data to show that although low pour point promotes pumpability and good distribution of the oil at low temperature this advantage is attended by more important off-setting disadvantages, namely: (1) Decrease of viscosity index and consequent increased difficulty in starting, (2) Increase in formation of carbon, (3) Increase of volatility and hence increased oil consumption, (4) Poorer lubricating properties as shown by lower load-carrying capacity and "oiliness," (5) Lowered oxidation stability and, consequently, development of sludge. On the other hand, the pour-point can be lowered by addition of an inhibitor. of wax crystallization without degrading the oil in the other respects. "Para Flow" is an inhibitor of this type. Oils treated with "Para flow" are stable as to cold test, do not affect the engine deleteriously, and show somewhat better lubricating properties than the untreated oils.

Some Problems in Lubrication of Rocker Arms. E. W. ZUBLIN. *Ind Eng. Chem.* **23** (1931) pp. 1434-6.

Difficulty in obtaining a grease that will lubricate, not run off, and not carbonize in the temperature range 0°F. to 350°F., and that will not hydrolyze in moist air or break down under the consistent pounding of the push rods is outlined. Climatic conditions in different parts of the country have an important effect. Aluminum soup greases have been most successful in the southwest. In the East a soda-soap grease has been more satisfactory for the ends of the push rods. A laboratory testing apparatus is described. The need for a much more detailed study of the subject is emphasized.

Oil Consumption as Affected by Engine Characteristics. H. C. MOUGEY. *Jour. S.A.E.* **29** (1931) pp. 200-14.

The most important factors in oil consumption are: (1) Engine speed. An increase in speed from 30 to 55 miles per hour can increase oil consumption seven fold. Road tests only are reliable because of the effect of wind past crank case openings. (2) Oil leaks, (3) Design of lubrication system and effect of wear. Pressure feed systems in general give higher losses than full splash system. (4) Viscosity of oil. High viscosity decreases oil thrown on cylinder walls and also leaking loss but results in poorer removal or drainage of oil from cylinder walls. (5) Volatility. If the temperature of the oil in the crank case is less than 170°F. volatility has little effect. (6) Pour point. Effect is indirect through engine wear. (7) Carbonization of oil control rings. Stoppage of holes and slots and sticking of rings results in higher oil consumption. (8) Length of time between oil changes. Too frequent changes in winter increase starting difficulty and tend to cause a lag between time of starting and time of adequate oil supply to bearings, thus increasing wear. The author also discusses viscosity-temperature characteristics and the range of temperature between the lower limit to which oil has a viscosity of 50,000 sec. Saybolt, beyond which the required cranking speed is difficult to obtain, and the upper limit at which fluidity is too high to obtain lubrication.

The Lubrication of the Gasoline Engine. P. V. ROSEWARNE. *Can. Dept Mines, Mines Branch, Memorandum, Series No.* 49 (1931) 16 pp.

A description of various lubricants for engines is given.

The Spontaneous Ignition of Fuel Oil. W. DUNKERLEY. *Pet. Times* **25** (1931) pp. 389-92.

An electrically heated silica-tube furnace for the determination of spontaneous ignition temperatures is described which is believed to avoid the defects of the Moore, Hawkes, and Bird apparatus.

NATURAL GAS, NATURAL GASOLINE, AND GAS RECOVERY

Gas Washing. F. SCHUSTER. *Gas U. Wasserfach* **74** (1931) pp. 951-4.

A Nomogram is presented relating vapor pressure, molecular weight, and weight per unit volume of vapor components of gases. Nomograms relating washing efficiency, weight of absorbent liquid per unit volume of gas, vapor content of gas, and weight of absorbent per unit weight of vapor absorbed are given. The nomograms are applied to the extraction of benzene from gas with tetralin.

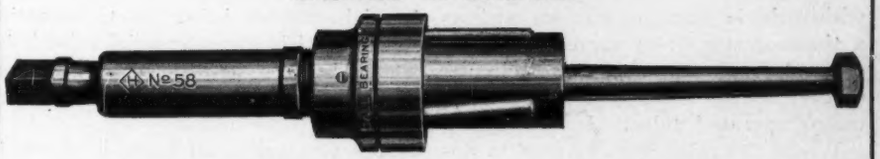
Analysis of Natural Gas from Russian Fields. S. S. NAMETKIN, ET AL. *Zhur. Prikladnoi Khim* **4** (1931) pp. 335-56.

The results of analyses by low-temperature fractionation are given.

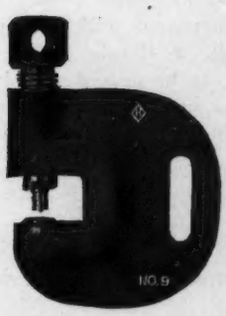
Analysis of Gaseous Hydrocarbons. R. ROSEN and A. J. ROBINSON. *Ind. Eng. Chem., Anal. Ed.* **3** (1931) p. 284.

A graph, constructed by the study of synthetic mixtures, is presented by the help of which analyses of refinery gases can be made in 60 to 75 min. The apparatus is described and results of analyses made by this method and by the Podbielniak apparatus are shown to be in close agreement.

Heavy Duty Expanders for Still Tubes



Tools for the Oil Industries



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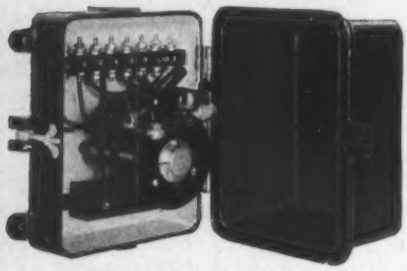
1. Motor Operated Relay

AUTOMATIC TEMPERATURE CONTROL COMPANY

Automatic Temperature Control Co., Inc., 34 East Logan Street, announces a motor operated relay, which has motor operated mercury contact tubes, and is mounted as standard in a cast aluminum case with hinged gasketed cover.



Motor Operated Relay

The "Motomerco" relay was designed primarily to select one of three control circuits when actuated by an instrument having sustained contacts for low and high positions only with an intermediate no-contact position. The design of the relay is such that it will automatically return to its mid-position and make a control circuit when the actuating instrument is at its intermediate no-contact position.

By means of the "Motomerco" relay, it is possible to use an instrument with a single sustained contact such as a thermometer or pressure gauge, for operating two separate control circuits as required to function a two-position motor operated valve.

Where the relay is to be used to operate two separate control circuits from an instrument with a single sustained contact, a simple mechanical adjustment can be provided to introduce any desired time lag up to 25 seconds, thus delaying a change in control circuits should the actuating instrument make accidental contact due to vibration or other cause.

Where it is desired to use three colored signal lights to indicate the condition of temperature, pressure or other controllable factor and the actuating instrument has intermittent instead of sustained contacts for low, normal and high positions respectively, the relay can be wired as a three-position, holding-in type so that it will remain in the position last energized, thus holding steadily the signal light corresponding to position of instrument stylus.

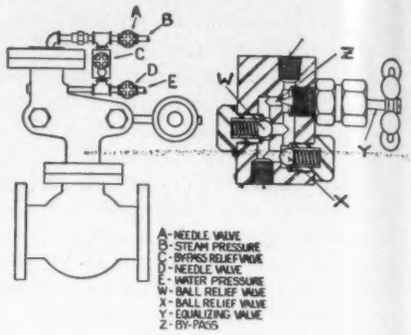
There are no open contacts with the "Motomerco" relay as all circuits are broken by mercury enclosed in glass tubes which are sealed under gas pressure. The actuating instrument will not develop contact trouble, even when subjected to severe vibration, as the motor used draws but 4 watts at 110 volts, according to the manufacturers.

2. Two-Way Relief Valve

NORTHERN EQUIPMENT COMPANY

Northern Equipment Company, Erie, Pennsylvania, announces a new two-way relief valve to safeguard the actuating element of a pressure control valve against excessive unbalanced pressures. These high unbalanced pressures are usually brought about by water hammer, or they may be encountered when bringing a high-pressure boiler up to operating pressure. The two-way relief valve is installed between the high (steam) and low (water) connections to the pressure control valve.

The two-way relief valve is shown in cross-section. The springs holding balls "W" and "X" are set for a maximum differential pressure of 200 pounds. In normal operation, the equalizing needle valve "Y" is closed, shutting off passage "Z."



Should steam pressure become more than 200 pounds greater than water pressure, ball "W" is moved from its seat and forced against the spring. This permits sufficient water to flow through the opening to stabilize the pressure differential at 200 pounds. With the pressure thus stabilized, ball "W" is forced back into its seat by the spring.

Should water pressure become more than 200 pounds greater than steam pressure, the excessive pressure is relieved by moving ball "X" from its seat until the pressure differential is stabilized at 200 pounds.

Thus, the actuating element of the pressure control valve is protected against unbalanced pressures of more than 200 pounds, regardless of changes in steam or water pressures.

Valve "Y" is simply a hand-operated needle valve provided to equalize the pressures when the pressure control valve is cut out of service. This is done by opening valve "Y" and thus opening passage "Z."

Needle valves "B" and "C" are used to throttle the pressures in the steam and water connections, thus preventing "hunting" caused by rapid pressure fluctuations.

3. Tank Car Safety Cone

A. Y. McDONALD MANUFACTURING COMPANY

The A. Y. McDonald Manufacturing Company, Dubuque, Iowa, has recently placed on the market a tank car safety cone for use in loading or unloading tank cars by the overhead method.

The purpose of the safety cone is to eliminate the old burlap bag method of enclosing dome openings during the loading or unloading process. It is made of heavy water-proof canvas, specially treated to make it as nearly fire-proof as possible. It eliminates all danger due to sparks—permits loading or unloading in all kinds of weather and reduces evaporation. The cone is constructed for use with pipe from two inches to six inches in di-

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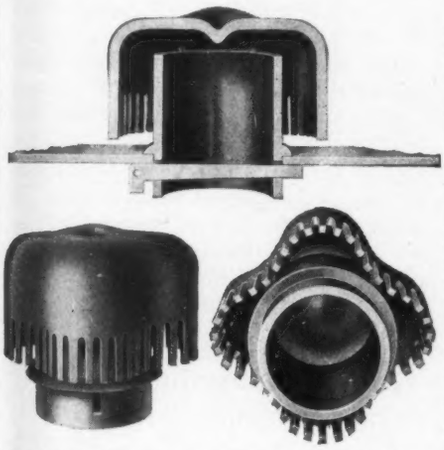
ameter, and it is claimed that no extra time is consumed when using it.

Being weighted at the bottom it fits snugly on the dome of the car, enclosing the dome opening. The loading or unloading pipe is inserted through the top and by a pull string arrangement the cone is held firmly to the pipe. Weighing only 21 pounds it can be easily carried to the dome of the tank car and may be dropped from the car without damage.

4. Bubble Cap

LEADER IRON WORKS

Leader Iron Works, Decatur, Illinois, has developed a new bubble cap for fractionating towers. The manufacturer claims a number of outstanding characteristics for the cap, among which are adaptability, efficient operation economy, ability to resist corrosion, contact efficiency, increased volumetric capacity, a tendency to eliminate surging, reduced liquid entrainment, and low initial and maintenance costs.



Sectional view of Leader cap in position

The bubble cap and nipple are cast from a special iron alloy, but special alloys are furnished when needed to combat excessive corrosive conditions.

5. Cooling Tower

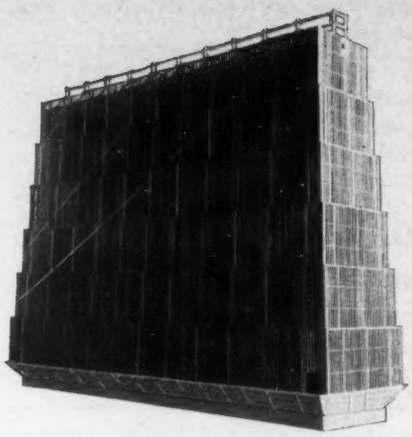
FLUOR CORPORATION, LTD.

Fluor Corporation, Ltd., Los Angeles, announces a new tower recently perfected and released for manufacture.

The physical appearance of this tower is unlike that of any tower previously manufactured or placed in operation, the Fluor Corporation claims. A construction feature of the tower is the vertical aerator panels which replace the louvers found in an ordinary cooling tower.

It is stated that these panels make it practically impossible for water to escape from the tower, even in case of extremely high wind.

The tower is said to have great



Fluor Tower

strength. It is constructed with practically the same framework as that of previous Fluor towers. In addition to this, the new taper construction, widening from top to bottom, adds a factor of stability.

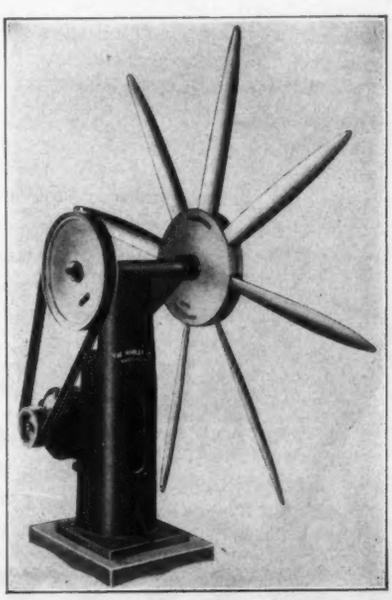
6. Fan for Cooling Towers

THE MARLEY COMPANY

The Marley Company, 1737 Walnut Street, Kansas City, Missouri, announces production of an indirect connected fan for cooling towers which features in its design relatively low speed and power consumption.

All blades of the fan are individually mounted on a common hub and are adjustable or removable to suit operating conditions. The speed of the fan may be regulated by changing sheaves of the drive.

The multi-blade fans are equipped with Timken roller bearings throughout. Hubs and blades are made of special aluminum alloy of high tensile strength. Motors furnished to drive the fans are fully inclosed and moisture-proof, while the pedestals are of cast iron.



Marley Fan

7. Coated Electrode

PAGE STEEL AND WIRE COMPANY

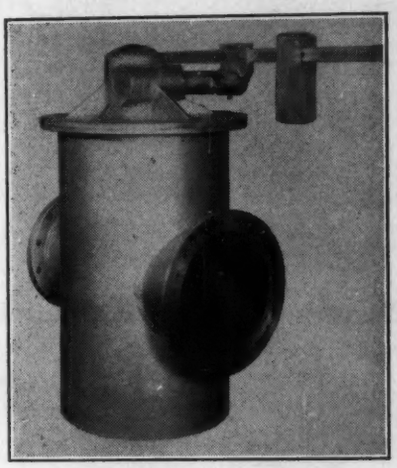
Page Steel and Wire Company, Monessen, Pennsylvania, has developed a new type of coated electrode which it claims gives quiet operation with little sputter, both tending to allow economical operation because of greater deposition of metal per pound of electrode.

The manufacturers state that the new electrode results in extra deep penetration and that the strength of the weld with it is equal to that of the base metal with a total elongation of 30 per cent when pulled to destruction.

8. Gas Valve

BLACK, SIVALLS & BRYSON, INC.

Black, Sivalls & Bryson, Inc., of Bartlesville, Oklahoma, recently turned out a 14-inch gas valve of the balanced type for use on the gas discharge line of oil and gas separators.



B. S. & B. Gas Valve

This 14-inch valve handles the gas discharged from one of the big American oil and gas separators used in the Oklahoma City field. Many of the separators used in the Oklahoma City field are of the Improved American type, in either the 7 foot diameter by 24 feet, 2 inches high separator or the size 7 feet by 27 feet. The 14-inch valve is fabricated out of steel plate, welded and machined by Black, Sivalls & Bryson at their Oklahoma City plant.

9. Cromaloy Flux

LINDE AIR PRODUCTS COMPANY

The Linde Air Products Company, 30 East 42 Street, New York, has developed Cromaloy flux especially for use in welding the chromium-containing alloys more generally known commercially as stainless steels or rustless irons.

Because of the excellent corrosion-resisting properties of these chromium-iron alloys, they are being used more and more extensively, and welded products in con-

stantly increasing variety are being fabricated from these alloys.

A satisfactory flux for use in welding these alloys must be sufficiently fireproof to protect the molten metal and hot metal adjacent to the weld from oxidation, and at the same time correctly compounded to dissolve the refractory chromium oxide with ease.

Because of its high solvent power for chromium oxide, and its high resistance to heat, Cromaloy flux is especially prepared for this type of work.

American Bosch High Tension Ignition Coil

10. Ignition Coil

UNITED AMERICAN BOSCH CORP.

United American Bosch Corporation, Springfield, Massachusetts, announces an addition to the American Bosch high tension ignition coil line designated at the TC-46 series in which the windings are so balanced that a special condenser is not necessary.

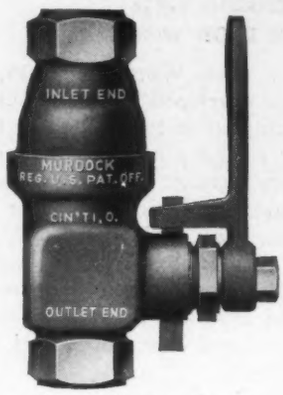
One feature of the coil, the manufacturer claims, is that if the current is left on, the coil will not overheat or burn out. Windings and core are sealed in a metal container, making them practically impervious to water, dust, oil and vibration. A rubber nipple is furnished to keep water out of the high tension terminal. The metal housing permits rapid dissipation of heat generated in the primary circuit into the air.

The manufacturer further states that the spark generated from the coil is very hot.

11. Air Valve

MURDOCK MANUFACTURING AND SUPPLY COMPANY

Murdock Manufacturing and Supply Company, 426 Plum Street, Cincinnati, Ohio, announces a quick opening and closing air valve which it claims is a radical departure from the accepted rules of design. Its principal feature is that it must be opened completely or closed completely, the design being such that it is impossible to obtain a partial aperture.



Murdock Gas Valve

The valve, called the "Q.O.C." valve, utilizes the cam action principle to eliminate up and down friction at the seat, thus tending to eliminate regrinding. The design of the gland or stuffing box is such that it can be repacked without taking the valve from the line or shutting off the air. Materials of the "Q.O.C." valve are all red brass, except the hard bronze cam shaft and the steel handle.

12. Belt Dressing

DIAMOND RUBBER COMPANY

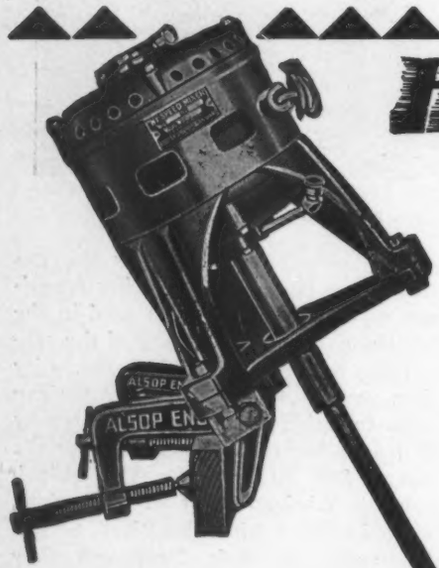
Diamond Rubber Company, Akron, Ohio, announces a new belt dressing called "Griptite" which is not greasy, not inflammable. Features of the dressing claimed by the manufacturer are that it doubles the pulling power of the belt and that its effectiveness increases with use, and that it retains its tackiness for an unusually long time.

13. Measurement Meter

BADGER METER MANUFACTURING COMPANY

Badger Meter Manufacturing Company, Milwaukee, recently put on the market a new type of meter employing the "dwell" principle and the principle of "equalized pressures which it claims is very accurate for measuring petroleum products.

The "dwell" principle provides that the piston "dwell" at the end of the stroke for one-eighth of the cycle, thus eliminating the problem of dead center, cutting down shock, simplifying



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47 West 63rd St.
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Badger Petroleum Meter

valve action and eliminating crank mechanism.

Through employment of the principle of equalized pressures, according to the manufacturer, tightness of pistons is not requisite for accuracy, and equal pressures are maintained on both sides of the four pistons, which work in pairs. Any leakage around the pistons is carrid out through a regulator and returned to the supply line without going through the measuring device.

The meter is built in 10 sizes, from three eighths-inch outlet to six-inch outlet.

14. Oxweld Welding Heads

LINDE AIR PRODUCTS COMPANY

The Linde Air Products Company, 30 East 42 Street, New York, N. Y., has developed a new series of welding heads with detachable tips for use with the Oxweld Type W-17 welding blowpipe. These will supplement the one-piece style heads for this blowpipe, so that the user will have a choice of two types of welding heads.

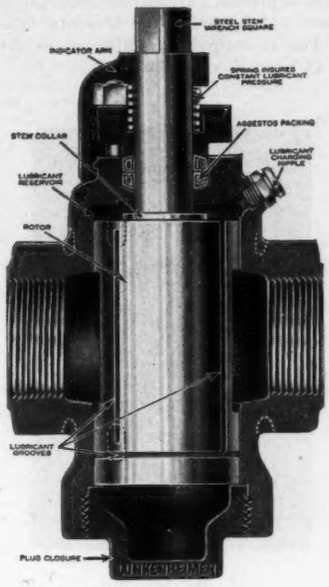
The new detachable tip heads were developed particularly for pipe line welding and for production operations. The new tip produces the same type of flame as that produced by the one-piece welding head for the Type W-17 blowpipe. Sizes Nos. 6 to 13, inclusive, are available in the new welding heads.

One of the practical features of the new design is the connection between the tip and the stem provided by the male thread on the tip which screws into the stem. Removal or replacement of the welding tip is thus greatly facilitated.

15. Lubricated Rotor Valve

THE LUNKENHEIMER COMPANY

The Lunkenheimer Company, Cincinnati, Ohio, recently placed on the market a lubricated rotor valve which is simple in design and provides the advantages of self-lubrication, absolute sealing and easy turning.



"Slaset" Valve

The new valve, called the "Slaset", is designed so that the lubricant is forced into the reservoir in the top of the rotor, pressure forcing the rotor down as the reservoir fills. The line pressure, aided by an external spring, causes the rotor to act as a booster plunger which forces the lubricant into pockets in the body and grooves in the rotor.

An indicator attached to the stem acts as a position open and closed stop and indicates the relative amount of lubricant in the reservoir.

The "Slaset" valve is a single acting valve made with screw ends for 150 pounds and flange ends for 125 pounds of gas or liquid pressure at 150° F.

Furnace Refractories

McLeod & Henry Company, Troy, New York, has released Bulletin No. 232 which describes different types of super-refractory blocks, bricks, and complete settings made of Carbex, the silicon-carbide refractory developed by McLeod & Henry Company. In the bulletin, the physical characteristics and manufacturing processes of Carbex are described in detail, together with a complete explanation of its advantages, limitations, and the high-temperature applications for which it is adapted in lining boiler and industrial furnaces, kilns, retorts, muffles, etc.

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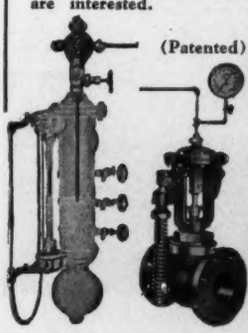

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ITEMS ABOUT MANUFACTURERS

Furnace Construction Company is the name of an organization which has been formed recently and has established headquarters in the Petroleum Tower Building at Dallas, Texas. It specializes in the design and building of radical brick chimneys, still and boiler settings, and other firebrick work. Officers include Carey E. Coryea, president; W. A. Vandaveer, vice president; and F. B. Pierce, secretary and treasurer.

Rudolph Fuess, Incorporated, Berlin, Germany, manufacturer of instruments for scientific research and industrial control, has established an American office at 245 West 55 Street, New York. Instruments manufactured by this organization include those for meteorology, microscopy, spectro-analysis, determination of flow and pressure of gasses, fluids and liquids, water level registering, temperature recording, and control and industrial processes.

C. F. Braun and Company announces that V. V. Jaccomini has been placed in charge of its Tulsa office.

Chain Belt Company, Chicago, announces that Russell G. Davis, manager of the company's Houston office for eight years, will leave for Chicago in March to become manager of that office. Prior to coming to Houston, Mr. Davis was with Chain Belt Company for eight years in Milwaukee.

Earth Products Company of Houston, Texas, incorporated for $300,000, was granted a charter February 12 to mine, process and market non-metallic minerals to be produced from its properties within the state. The company will specialize in preparation of bleaching earths, stucco, high temperature refractories, asbestos, moulding sand, silica flour, volcanic ash, talc, calcium carbonate, barite, kaolin, and in the grinding of non-metallic commodities to customers' specifications. Officers of the new company are: W. W. Rodgers, president; E. G. Noxon, executive vice president; Walter Morgan, vice president, and Grace V. Noxon, secretary-treasurer.

American Tank & Equipment Corporation, Oklahoma City, the manufacturing subsidiary of Black, Sivalls & Bryson, Incorporated, Bartlesville, Oklahoma, has recently delivered a

tower for the Toledo, Ohio, plant of Gulf Refining Company. This tower is 102 inches in diameter by 55 feet high. It weighs 63,140 pounds and was tested at 150 pounds pressure. The tower was designed by Jackson Engineering Corporation of Tulsa.

Hiergesell Brothers, 2518 North Broad Street, Philadelphia, announces that R. W. Bergen, for six years a process chemist for National Refining Company of Ohio in the Marietta, Ohio refinery, has recently been employed in the capacity of general sales manager.

R. W. BERGEN

Mr. Bergen received his training under his father, one of the oldtimers in the refining industry, and under Professor E. L. Krause, head of the department of chemistry at Marietta College and also chief chemist for National Refining Company's Marietta, Ohio, refinery.

M. L. Rosenblum, formerly of Pittsburgh, Pennsylvania, has opened an office in the Merchants and Manufacturers Building, Houston, where he will broker a number of steel products to the producing and refining branches of the oil industry.

Goulds Pumps, Incorporated, Seneca Falls, New York, conducted a three-day training school for 38 salesmen of Eastern wholesale distributors in February. Such subjects as working principles, construction features, applications to various jobs, installation troubles and their remedies, and selection of materials for pumps were studied.

Pacific Pipe & Supply Company, Los Angeles, California, has been appointed jobber in that locality for Tube-Turns, Incorporated, manufacturers of stock fittings for pipe welding.

Goulds Pumps, Incorporated, Seneca Falls, New York, announces the resignation of H. S. Fredenburgh as secretary and comptroller after he had been with the corporation for more than 20 years. Seabury S. Gould, second vice-president, succeeds Mr. Fredenburgh as secretary and the late William D. Pomeroy as a member of the board of directors. Hamilton Garnsey, Jr., has been appointed assistant to the president.

Lukenweld, Incorporated, Coatesville, Pennsylvania, has appointed two new representatives to handle the sales and service of its products. In Wisconsin, Lukenweld, Incorporated, is now represented by Welding Engineering Company, 2872 North 41st Street, Milwaukee. This concern is headed by A. H. Friese, who for many years has been engaged in engineering and sales work in connection with welding and welding apparatus. In the Buffalo, N. Y., territory, Lukenweld, Incorporated, is represented by Marvine Gorham, Jackson Building, Buffalo, Mr. Gorham is a graduate of Massachusetts Institute of Technology and has had many years of experience in the metal-working industries, particularly in the sale and service of castings, pressed steel, forgings and stamping.s

Buck & Stoddard, Incorporated, of Los Angeles, is the California distributor for a new line of drop forged welding fittings, which were recently placed on the market by Bonney Forge & Tool Works of Allentown, Pennsylvania, to meet the need for a welding fitting that will simplify making welded tee junctions in pipe. These fittings are known as Weldolets and Thredolets. They serve as outlets to which the branch pipe can be attached by welding, in the case of Weldolets, or by screw thread, in the case of Thredolets. Both fittings are attached to the main by welding.

Gray Processes Corporation, 961 Frelinghuysen Ave., Newark, N. J., recently installed the latest type of Co-operative Fuel Research anti-knock testing engine and is using, in the determination of anti-knock rating of motor fuels, the method recommended by the co-operative fuel research committee.

Chicago Steel Service Company announces that J. F. Mehlhope, formerly Chicago district sales manager for Central Alloy Steel Corporation and later for Newton Steel Company, has joined the sales force of Chicago Steel Service Company, warehouse distributors for Toncan Iron and Enduro Stainless Steels, products of Republic Steel Corporation.

International-Stacey Corporation announces that its Fort Worth offices, together with those of its subsidiary companies, International Derrick & Equipment Company, Roots-Connersville-Wilbraham, Stacey Brothers Gas Construction Company and Stacey Manufacturing Company, have been moved to Room 307, Southland Life Insurance Company Building, Dallas. F. W. Mohler, Mid-Continent sales manager, and C. B. Caldwell, sales engineer for the Stacey and Roots-Connersville-Wilbraham divisions, and S. B. Creamer, sales engineer for International Derrick & Equipment Company, will be located in the Dallas office.

Greenfield Tap and Die Corporation, Greenfield, Massachusetts, announced in February the election of Charles N. Stoddard as president and general manager of the corporation.

Chaplin-Fulton Manufacturing Company, Pittsburgh, Pennsylvania, announces the appointment of C. H. Collins as representative for C-F regulators in the Kansas City, Missouri, territory. Mr. Collins will maintain offices at 628 Dwight Building, Kansas City.

Barber-Greene Company, Aurora, Illinois, announces the appointment of the Boehck Equipment Company of Milwaukee as Wisconsin representative. Offices and warehouses of the latter organization are located at 2404 West Clybourn Street.

CATALOGS . . . BULLETINS

Helpful Publications Which Manufacturers Will Be Glad to Send Free for the Asking

Valves

Homestead Valve Manufacturing Company, Coraopolis, Pennsylvania, recently published Reference Book No. 36, superseding all previous issues. In the book are described the Homestead quarter-turn principle, brass straightway valves, semi-steel straightway valves with brass plugs, all semi-steel straightway valves, semi-steel lubricated valves, straight round port valves of semi-steel and of bronze, lift type valves, angle valves, blowoff valves, three-way valves, four-way valves, hydraulic operating valves, hydraulic spray valves.

Steel Welding Fittings

Taylor Forge & Pipe Works, P. O. Box 485, Chicago, Illinois, has released Bulletin 32-1 tabulating latest dimensional and list price data on flanges and seamless steel fittings for welding, a copy of which may be obtained by writing the manufacturer.

Electric Steam Generators

General Electric Company, Schenectady, New York, has released Bulletin GEA-1372A, superseding GEA-1372, on electric steam generators for process work. The bulletin contains a description of various sizes and types of electric steam generators made by the company and gives typical installations of same.

Oil Handling Items

The A. Y. McDonald Manufacturing Company, Dubuque, Iowa, has recently issued a new combination net price list and catalog. This catalog illustrates, describes and gives net prices on the complete A. Y. McDonald line of oil handling equipment. It also includes a dozen or more new items that have been recently developed by this company.

Instruments

Neilan Company, Limited, 641 Santa Fe Avenue, Los Angeles, recently issued Bulletin No. 3060 B, describing Neilan instruments for temperature control, bulbs, sockets, tubing, and similar apparatus.

Heat Exchangers

Alco Products, Incorporated, 220 East 42 Street, New York, has recently issued a catalog of heat transfer equipment for the oil industry, producing and refining branches. The catalog is comprised of two bulletins. Bulletin No. 1012, "Heat Transfer Equipment for the Oil Industry," shows distillation units, vertical single pass heat exchangers, combined vacuum condenser-receivers, horizontal vapor condensers, floating head exchangers, tank type vaporizers, gas coolers, gasoline condensers, and miscellaneous related data. Bulletin No. 1013, "Shell and Tube Type Jacket Water Coolers" shows pipe line engine jacket water coolers, fixed head coolers, packed head coolers, vertical final condensers, vapor heat exchangers and condensers of horizontal types, horizontal vapor condensers for vacuum service, liquid-to-liquid exchangers, liquid heaters, gas coolers, baffles and tube bundles, longitudinal shell baffles, floating heads, tube joints, bolted joints, tube passes, reboilers and vaporizers.

Bubble Cap

Leader Iron Works, Decatur, Illinois, recently issued a booklet titled "Facts Touching on Fractionation and Absorption Problems," and the discussion centers largely around the Leader bubble cap which has featured in its design adaptability, efficiency, and economy.

Pressure Regulators

The Fisher Governor Company, Incorporated, Marshalltown, Iowa, has released for distribution Bulletin No. 70 covering the Fisher Series Type 4000 pilot operated pressure regulators in which the pilot valve involves a new adoption of the Bourbon tube principle and give sensitive control on all types of pressure installations.

Welded Vessels

Henry Vogt Machine Company, Incorporated, Louisvile, Kentucky, recently issued a 24-page, illustrated book depicting the merits of the advanced method of electric welding on pressure and temperature equipment. The bulletin is No. W-1, and it is titled "Vogt Homoweld."

Flow Instruments

C. J. Tagliabue Manufacturing Company, Park and Nostrand Avenues, Brooklyn, New York, has issued Bulletin No. 1020 describing Tag flow instruments. Among those instruments illustrated and described are flow recorder-controllers for liquids, flow meters and orifice meters for gases, flow recorder-controllers for gases, and liquid level recorder-controllers.

Turbine Pumps

De Laval Steam Turbine Company, Trenton, New Jersey, has issued Catalog B-3, describing a balanced single suction series pump, a two stage pump having single suction impellers placed back to back, that is, with the suction openings facing towards the ends of the shaft.

Steam Equipment

American District Steam Company, North Tonawanda, New York, has released its 1932 catalog covering the Adsco line of slip type and packless expansion joints, underground steam conduit, insulation and accessories, condensation and steam flow meters, water heaters, steam traps, separators, strainers, alignment guides, and allied specialties for underground steam and hot water lines.

Turbines—Motors

Elliott Company, Jeanette, Pennsylvania, announces publication of two bulletins: Bulletin H-7, devoted to steam turbine generators, and Bulletin J-4, devoted to commutating pole direct current motors. Both bulletins are illustrated.

Oiling Devices

The Lunkenheimer Company, Cincinnati, Ohio, has released for distribution a 16-page illustrated booklet titled "Lunkenheimer Oil Cups and Oiling Devices," the contents of which are indicated in the title.

Regulators

The Mercon Regulator Company, 1 La Salle Street, Chicago, has issued for distribution during 1932 Catalog No. 5, covering its complete line of pressure and flow regulators and containing a description of its new adjustable port features and of its new liquid level controllers.

Cooling Equipment

National Radiator Corporation, Cast Products division, Johnstown, Pennsylvania, has released Catalog CP-2, showing sections it manufactures for condensing vapors, cooling liquids and for general use in the producing and refining branches of the oil industry.

Draft Gage

The Hays Corporation, Michigan City, Indiana, has released for distribution draft gage catalog PGA-32, featuring pointer gauges for draft pressure, differentials and temperature.

Wrenches

J. H. Williams & Co., 75 Spring Street, New York, has released the twenty-first edition of its catalog of wrenches for all purposes. Included in the illustrated 215 page catalogue are descriptions of midget wrenches, electrical wrenches, various combinations of socket wrenches, 15-degree angle, single and double head wrenches, 75-degree angle double end wrenches, 22½-degree angle double end wrenches, construction wrenches, single and double offset box wrenches, check nut wrenches, monkey wrenches, chain tongs, chain pipe vises, tool holders, lathe dogs, clamps, wire rope sockets, hooks, eye bolts, and other related tools.

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Please send to me, without obligation, free booklet described in the March issue of THE REFINER AND NATURAL GASOLINE MANUFACTURER.

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THE MONTH IN REVIEW

W. P. R. A. Board Considers New Gasoline Specifications

MEMBERS of the Western Petroleum Refiners Association recommended adoption of a set of gasoline specifications to the board of directors Excelsior Springs Missouri, April 8, the last day of the annual meeting. Officials of the organization were elected as follows:

President, George D. Locke, vice president of Barnsdall Refineries, Inc., Chicago; vice presidents, H. T. Ashton, president of Lubrite Refining Company, St. Louis; C. L. Henderson, vice president of Vickers Petroleum Company, Wichita; L. H. Barton, president of Lion Oil Refining Company, Eldorado, Arkansas, and E. J. Marston, president of Texas Pacific Coal & Oil Company, Fort Worth.

Directors Named

Directors elected are R. G. Van Der Woodey, Shell Petroleum Corporation, St. Louis; A. E. Landsittle, Globe Oil & Refining Company, Tulsa; E. S. Karstedt, Continental Oil Company, Ponca City; D. P. Hamilton, Root Refineries, Shreveport; H. A. Trower, Phillips Petroleum Company, Bartlesville; L. H. Pritchard, Anderson & Pritchard, Oklahoma City; R. R. Irwin, White Eagle Petroleum Corporation, Kansas City; Sheldon Clark, Sinclair Refining Company, Chicago; L. B. McCammon, Marathon Oil Company, Tulsa; R. W. McDowell, Mid-Continent Petroleum Corporation, Tulsa; D. J. Moran, Continental Oil Company, Ponca City; Ben Gray, Louisiana Oil Refining Corporation, Shreveport; L. B. Simmons, Rock Island Refining Company, Duncan; David Harris, Spartan Oil Company, Chicago; L. E. Phillips, Phillips Petroleum Company, Bartlesville; John L. Gray, Deep Rock Oil Corporation; Tulsa; Rex Winget, Cushing Oil Refining Company Cushing; W. G. Skelly Oil Company, Tulsa.

Ex-officio Directors

Ex officio members of the board are following past presidents of the organization, George N. Moore, Cosden Oil Company, Fort Worth; D. W. Moffit, Tulsa; Roy B. Jones, Panhandle Refining Company, Wichita Falls; L. R. Crawford, Producers & Refiners Corporation, Independence; and P. M. Miskell, Empire Oil & Refining Company, Tulsa.

GEORGE D. LOCKE
Elected President Western Petroleum Refiners Association

Natural Gasoline Association Program

THE Natural Gasoline Association of America will hold its next annual convention at Tulsa, May 17, 18 and 19, at which time the sessions will be devoted to economic and technical development within the industry. The Natural Gasoline Supply Men's Association will again furnish the entertainment, consisting of luncheons, a stag smoker and dance. Following is the program as announced by Ray Miller, secretary of the association:

Tuesday, May 17

12 o'clock noon—Luncheon, furnished by Natural Gasoline Supply Men's Association.

Afternoon session—1:30 o'clock.

Address of welcome—Frank L. Chase, Lone Star Gasoline Company.

President's address—S. S. Smith, Shell Petroleum Corporation.

Reports of active standing committees.

Paper, "Properties of Hydrocarbons at High Pressures as Applied to the Design of Absorbers, Strippers and Stabilizers"—Dr. G. G. Brown, University of Michigan.

"Refinery Vapor Recovery Systems, Including the Physical Properties and Utilization of Products"—Author to be selected.

8 p.m.—Stag smoker, furnished by Natural Gasoline Supply Men's Association.

Wednesday, May 18

Morning session—9:30 o'clock.

Broad Discussion of Economics of Natural Gasoline Industry—R. C. Alden, Phillips Petroleum Company. (It is planned to preprint Mr. Alden's paper and distribute it in advance at the registration desk. In this session Mr. Alden will briefly outline his paper in sections and lead the discussion on those sections.)

Afternoon session—2 o'clock.

"Natural Gasoline Markets and the New Grading System"—J. A. LaFortune, Warren Petroleum Company.

"The East Texas Field"—G. H. L. Kent, Humble Oil & Refining Company.

"Pipe Line Transportation of Natural Gasoline"—O. C. Field, O. C. Field Gasoline Corporation.

9 p.m.—Dance, furnished by Natural Gasoline Supply Men's Association.

Thursday, May 19

Morning session—9:30 o'clock.

"Operating Economics Effected During 1931"—Fred Shryock, Shell Petroleum Corporation.

"Specifications, Stenches and Markets for Liquefied Petroleum Gases"—G. G. Oberfell or T. W. Legatski, Phillips Petroleum Company.

"Carbon Dioxide"—H. Ross Campbell, Crosbie & Moran, Inc.

"Blending Natural Gasoline With Refinery Products"—J. L. Gallagher, Sinclair Oil & Gas Company.

12 o'clock noon—Luncheon, furnished by Natural Gasoline Supply Men's Association.

A. S. T. M. Committee On Petroleum

A. S. T. M. Committee D-2 on Petroleum Products and Lubricants held its regular meeting on March 8, 1932, in Cleveland, in conjunction with the A. S. T. M. spring group meetings of committees, with a large and representative attendance from consumers, producers and general interests alike. T. A. Boyd, in charge of the Fuel Section of the Research Laboratories of General Motors Corporation, Detroit, was unanimously elected chairman of the committee to fill the vacancy caused by the death of F. A. Hull, General Electric Company. Mr. Boyd was also unanimously chosen to be the guest of honor at the annual D-2 dinner to be held in Atlantic City during

the week of the A. S. T. M. annual meeting, June 20-24.

Committee D-2 voted unanimously to approve the request made by the Standing Committee of Producers and Users of Stoddard Solvent to become associated with Committee D-2 in formulation of specifications for Stoddard Solvent and of methods of test. This group has functioned heretofore under the auspices of the Division of Trade Standards, a part of the Bureau of Standards, Department of Commerce. Hereafter the same group, without losing its identity, will function as Technical Committee D on Stoddard Solvent, the officers being: Chairman, Dr. Lloyd E. Jackson, Mellon Institute; vice chairman, W. J. Stoddard, president, National Association Institute of Dyeing and Cleaning; secretary, H. H. Steidle, Division of Trade Standards, Bureau of Standards, Washington, D. C.

Committee D-2 also voted unanimously to publish for information the description of method for determining Octane Numbers of motor fuels based on the work of the Detonation Subcommittee and the Cooperative Fuel Research Committee, jointly sponsored by the Society of Automotive Engineers, the American Petroleum Institute and the National Automobile Chamber of Commerce. While D-2 is not yet prepared to submit this method to the A. S. T. M. for adoption as a tentative standard, it is the belief that both petroleum and automotive industries will be glad to have available a complete and carefully edited description in A. S. T. M. form.

Oil Items In the Tax Bill

OIL appeared in the increased taxes adopted by the House of Representatives in three items. Lubricating oil will carry a tax of four cents a gallon; imported oil bears a levy of 42 cents a barrel; pipe line transportation bears a tax of eight per cent of carrying charges.

The tax on lubricating oil evidently will be borne by the industry. It will be difficult to add one cent to the retail price of lubricating oil. The tax on imports is the result of tariff agitation over the past two years. The rate on pipe line delivery likely will be added to existing tariffs.

Revenues expected from these taxes on oil are: lubricating oil, $35,000,000; imports, $25,000,000; pipe line transportation, $15,000,000.

Alcohol in Gasoline

"THE Solubility of Ethyl Alcohol in Gasoline," by O. C. Bridgeman and D. Querfield, before the Division of Petroleum Chemistry, American Chemical Society, New Orleans, March 28-April 1, reports that ethyl alcohol blended with gasoline as a motor fuel has several known advantages and disadvantages, one of the latter being the limited solubility of alcohol in gasoline. This paper gives data on the solubility of alcohol containing various percentages of water in eight fuels from various sources and three topped gasolines.

The method was to make quantitative mixtures, warm until blending was complete, then cool slowly until turbidity indicated the separation of a second phase. The critical solution temperature obtained in this way was found to be markedly increased by small amounts of water, to be nearly the same for different straight-run gasolines of same volatility regardless of crude source, but lower for cracked gasoline than for straight-run. Topping a gasoline from 437° F. end point to 375° F. lowers the critical solution temperature by 20° C. Four tables of data are given.

The Centrifuge In Acid Treating

IN his paper, The Centrifuge in Acid Treating, before the American Chemical Society, Division of Petroleum Chemistry, New Orleans, March 28 to April 1, Leo D. Jones (Sharples Specialty Company) reviews the reasons for believing that when petroleum oils are treated with acid in commercial quantities, the actual time of reaction is very short and is later followed by other reactions which are detrimental. The course of action of the acid on the oil was followed by examination under the microscope, showing gradual transfer of color from oil to the drops of acid, then finally evolution of gas at the interface.

A systematic series of runs on small batches of oil-acid mixtures is reported, indicating that a short time of contact (60 to 90 seconds) and low temperatures give best results. Such conditions could be met by use of a centrifugal, which is described.

The Oil Man's Calendar

APRIL
- 21-22 *National Petroleum Association, Cleveland, Ohio (Semi-Annual)*
- 26-28 *Southwestern Gas Measurement Short Course, Norman, Oklahoma.*
- 27-29 *American Welding Society, New York (Annual.)*

MAY
- 4- 6 *National Foreign Trade Council, Honolulu, Hawaii.*
- 9-11 *Natural Gas Department, American Gas Association, Tulsa, Oklahoma.*
- 9-13 *National Fire Protection Association, Atlantic City, N. J.*
- 17-19 *Natural Gasoline Association of America, Tulsa, Oklahoma (Mayo Hotel.)*

JUNE
- 1- 3 *American Petroleum Institute (Mid-Year Divisional Meetings), Tulsa, Oklahoma (Mayo Hotel.)*
- 20-24 *American Society for Testing Materials, Atlantic City, N. J.*

SEPTEMBER
- 14-16 *National Petroleum Association, Atlantic City, N. J. (Annual.)*

NOVEMBER
- 15-17 *American Petroleum Institute, Houston, Texas (Annual.)*

NOTICE

We are advised that a man named P. S. Raymond who claims to be a representative of *The Refiner* has recently been soliciting subscriptions to this publication in Kansas. This is to advise that this publication has no subscription solicitors. Its circulation is all secured by mail. So please do not pay any money for subscription to *The Refiner* to anyone claiming to be our agent.

The REFINER and NATURAL GASOLINE MANUFACTURER

Waste Clay Aids Cement

WASTE clay used in contact filtration work in treatment of lubricating oils, gasoline and kerosene, often a burden in its disposal at refineries has been found to render service in Portland cement manufacture. J. M. Evans of the research department of Associated Oil Company, Los Angeles, California, has found that three to five per cent of this clay when ground into Portland cement at the time of manufacture produces a cement having greater plasticity as well as waterproofing properties and increased strength. The plasticity makes the cement spread more easily, and gives a smoother finish. Water-proofing is valuable in stucco work and in foundations. Increased tensile and compressive strength adds to the value.

Spent contact clay has been used in the refineries to pack around transfer lines to retard corrosion, to lay as a base under steel tanks, and the like, but a large portion of it has to be dumped.

Laboratory Still And Fractionating Column

"LABORATORY Batch Still and Fractionation Column for Production and Study of Lubricating Distillates Under Vacuum," Report of Investigations, R. I. 3159, March, 1932, is ready for distribution by the Bureau of Mines, and may be secured by writing Section of Publications, without cost. This report, prepared by Boyd Guthrie and Ralph Higgins, describes the construction of the visible-action laboratory batch still and column and gives certain data pertaining to the operation of the apparatus under vacuum for the production of lubricating distillates. The apparatus was designed and built to produce distillates under as nearly ideal conditions as possible, in order that a subsequent study of the characteristics of the distillates could be made. Many interesting conclusions, which may be drawn from the information presented are not discussed in the first report, but will be presented in a more complete paper on fractionation and treating of lubricating distillates which is now being prepared by the same writers.

Treating With Magnesium Hydroxide

UNDER the title "Magnesium Hydroxide in the Petroleum Industry," by F. T. Gardner of the University of Tulsa, and E. C. Higgins, Jr., of Long Beach, California, before the Division of Petroleum Chemistry, American Chemical Society, New Orleans, March 28 to April 1, the use of magnesium hydroxide instead of caustic soda for removal of certain impurities from hydrocarbons is described. The application of the base in solid granular form, over which the liquid or gas undergoing treatment may pass, offers possibility of a long operating cycle with minimum handling expense.

Magnesium hydroxide mined as "Brucite" has the qualities needed. Removal of phenol and H_2S, the neutralization of gasolines, and the alteration of mercaptans to produce sweetened gasoline is shown by experimental evidence. Commercial operation is discussed. The magnesium hydroxide may be easily regenerated. Four tables, a flow sheet, and sketch of a tower are given.

U. S. and foreign patents pending. The process is owned and controlled by Process Development Company, 2759 East Willow St., Long Beach, California.

▼ ECONOMICS ▼

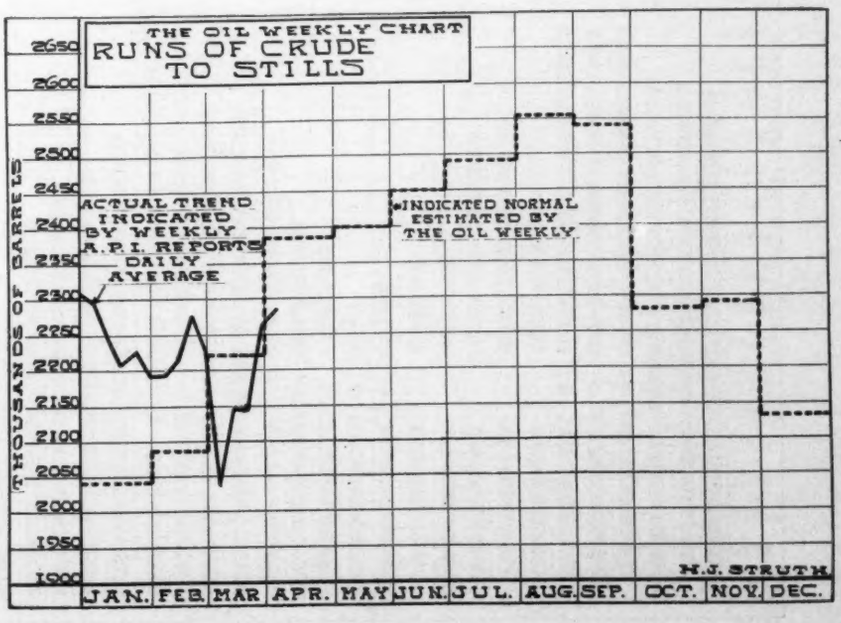
H. J. STRUTH, *Staff Economist*

Crude Prices Take Turn Upward

CRUDE oil prices have apparently reached a definitely higher level, since major purchasing companies are gradually meeting the advance of 15 cents a barrel posted for the Mid-Continent on April 1 by Continental Oil Company. For a time, it looked as if the upturn in the crude market was a bit premature and would not meet the support of a majority of the major purchasing companies. However, with a few exceptions, large crude buyers throughout Oklahoma, Kansas, Louisiana, Arkansas, Texas and New Mexico have announced advances of from 10 to 15 cents a barrel. Companies that have not as yet met the new price scale are expected to do so immediately.

Some of the major purchasing companies, directly interested in refining and marketing, have stated that a higher crude price was not justified until prices of refined products reached somewhat higher levels. Yet, these companies were among the first to post advances in retail gasoline prices and have increased wholesale gasoline prices from a low of 2⅝ cents to above four cents a gallon during the past 30 days. If the relationship of the price of gasoline to the price of crude oil is taken into consideration, it is apparent that the new, higher price for crude is somewhat out of line, but underlying conditions point to a definite upward movement in the gasoline market that will undoubtedly equalize existing differences in the immediate future. Higher crude prices dictate higher refined oil prices, and since the gasoline market began to advance lustily prior to the advance in the crude market, it is seen that the movement is of a more or less general nature, justified by over-all improvement in the industry's statistical position.

The producing branch of the industry is entitled to a higher price for crude, as statistics show that the supply level has been maintained well within the zone conducive to market



Crude Runs to Stills, Gasoline Stocks and Gas and Fuel Oil Stocks

Report for Week Ending April 2, 1932

(Figures in barrels of 42 gallons)

District	Potential Cap. (Daily) Total	Potential Cap. (Daily) Reporting	Per Cent	Crude Runs to Stills Total	Crude Runs to Stills Daily Average	Crude Runs to Stills Per c't Operated	Gasoline Stocks (see note below)	Gas & Fuel Oil Stocks
East Coast	633,700	633,700	100.0	3,072,000	438,900	69.3	7,015,000	5,848,000
Appalachian	149,600	137,400	91.8	628,000	89,700	65.3	1,858,000	1,114,000
Indiana, Illinois, Kentucky	436,300	431,500	98.9	2,217,000	316,700	73.4	6,510,000	4,040,000
Oklahoma, Kansas, Missouri	485,700	435,200	89.6	1,499,000	214,100	49.2	3,953,000	2,986,000
Texas	838,200	765,400	91.3	3,496,000	499,400	65.2	8,764,000	8,700,000
Louisiana-Arkansas	233,100	230,500	98.9	1,117,000	159,600	69.2	1,901,000	4,287,000
Rocky Mountain	160,900	143,800	89.4	212,000	30,300	21.1	2,027,000	637,000
California	914,500	884,100	96.7	3,145,000	449,300	50.8	14,491,000	96,498,000
Total week April 2	3,852,000	3,661,600	95.1	15,386,000	2,198,000	60.0	46,519,000	124,110,000
Total week March 26	3,852,000	3,665,600	95.2	15,232,000	2,176,000	59.4	46,726,000	124,173,000
Total week March 19	3,852,000	3,665,600	95.2	14,595,000	2,085,000	56.9	46,428,000	124,120,000
Total March 12	3,852,000	3,665,600	95.2	14,446,000	2,063,700	56.3	45,661,000	125,023,000
Total March 5	3,852,000	3,665,600	95.2	13,778,000	1,968,300	53.7	45,429,000	126,175,000
Total Feb. 27	3,852,000	3,665,600	95.2	14,999,000	2,142,700	58.5	45,567,000	127,236,000
Total April 4, 1931	3,730,100	3,571,200	95.7	15,623,000	2,231,900	62.5	*45,603,000	126,433,000
Texas and Louisiana Gulf Coastal figures shown below are included above in totals of their respective districts								
Texas Gulf Coast	532,500	531,500	99.8	2,825,000	403,600	75.9	7,195,000	6,088,000
Louisiana Gulf Coast	147,500	147,500	100.0	817,000	116,700	79.1	1,778,000	3,627,000

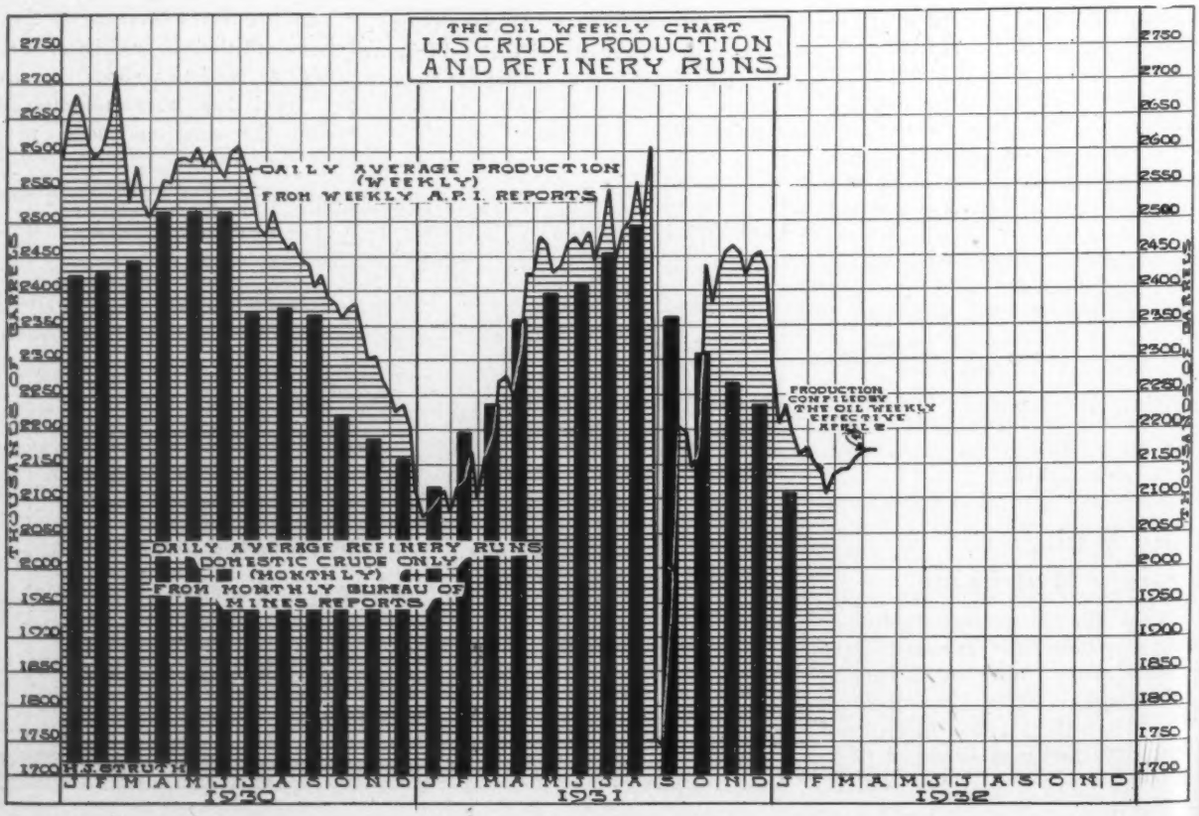
NOTE: Stocks at refineries, except in California district, which includes stocks of finished gasoline and engine distillate at refineries, water terminals and sales distributing stations and amounts in transit thereto.

*This figure is not entirely comparable with current stocks due to revisions made since original publication of this figure, for which revisions the basic information is not available by weeks. If it were possible to have made the revision, the new figure would reflect somewhat lower stocks.

improvement. This has been shown month after month in the Oil Industry Barometer, appearing in the REFINER AND NATURAL GASOLINE MANUFACTURER, The barometer for February, appearing on page 265 shows continued improvement, with production and stocks of crude being maintained somewhat below the levels of last year. Statistics for the refining branch are not as favorable as those for the producing branch, as the index of supply is somewhat above last year, with demand falling below that of a year ago. Increased cracking operations constitute the principal unfavorable development at present, as the production of gasoline is already too high, with refinery stocks about three per cent above the level of last year. This indicates that an adjustment is necessary either in cracking operations or in refinery crude runs. At any rate, it dictates caution against increasing operations too rapidly at present, despite increased shipments at higher prices.

Gasoline stocks are still above normal and the only way for the refiner to insure a continuation of the upward movement in prices is to maintain operations at a rate conducive to a substantial withdrawal from stocks to supply the gradually rising demand.

The immediate future of the refiner


THE OIL WEEKLY CHART
U.S. CRUDE PRODUCTION AND REFINERY RUNS
DAILY AVERAGE PRODUCTION (WEEKLY) FROM WEEKLY A.P.I. REPORTS
DAILY AVERAGE REFINERY RUNS DOMESTIC CRUDE ONLY (MONTHLY) FROM MONTHLY BUREAU OF MINES REPORTS
PRODUCTION COMPILED BY THE OIL WEEKLY EFFECTIVE APRIL 2
THOUSANDS OF BARRELS
THOUSANDS OF BARRELS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1930
1931
1932

Cracked Gasoline Production

Report for Week Ending April 2, 1932

	(Barrels of 42 gallons) Potential Charging Capacity			Production	
	Total	Daily Reporting	Per Cent	Total	Daily Average
East Coast	261,300	236,300	94.1	590,000	84,300
Appalachian	56,300	54,100	96.1	174,000	24,800
Ind., Ill., Ky.	330,400	315,400	95.5	605,000	86,400
Okla., Kans., Mo.	237,800	219,500	92.3	357,000	51,000
Texas	450,800	436,200	96.8	633,000	90,400
Louisiana-Arkansas ..	112,400	112,400	100.0	209,000	29,900
Rocky Mountain	99,900	98,400	98.5	65,000	9,300
California	190,800	190,800	100.0	289,000	41,300
Total week April 2...	1,739,700	1,663,100	95.6	2,922,000	417,400
Total week Mar. 26..	1,739,700	1,663,100	95.6	3,021,000	431,600
Total Week Mar. 19..	1,739,700	1,663,100	95.6	2,889,000	412,700
Total March 12.....	1,739,700	1,663,100	95.6	2,813,000	401,900
Total March 5.....	1,739,700	1,663,100	95.6	2,877,000	411,000
Total Feb. 27	1,739,700	1,663,100	95.6	3,088,000	441,100
Total April 4, 1931...	1,589,600	1,508,500	94.9	2,964,000	423,400
The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.					
Texas Gulf Coast....	352,400	347,400	98.6	503,000	71,900
La. Gulf Coast	77,000	77,000	100.0	152,000	21,700

appears unusually bright, but the degree of profitableness to be expected depends primarily upon the maintenance of adequate control of still runs.

Gasoline demand in both January and February was above expectations. Weekly reports of the American Petroleum Institute indicate that shipments are already beginning to exceed output of gasoline. With prices showing firmness and demand becoming brisk, the natural tendency among refiners is to increase runs and bring about a reduction in operating costs per barrel run. Experiences of the past should be taken into account now as a guide to the extent to which operations are increased. Small plants, with practically no stocks of gasoline at hand are naturally expected to increase runs to maximum capacity. Large plants, holding the bulk of the surplus gasoline supply should keep runs at a rate somewhat below daily shipments in order to bring stocks down to a normal level. If runs are not increased to any considerable extent above the present rate of 2,284,000 barrels a day, it is believed that increasing demand over the next few weeks will effect a substantial reduction in gasoline stocks.

Little Change in Oil Field Operations

FIELD operations in March showed practically little change over those of February, the rate comparing favorably on a daily average basis compared with the preceding month. Well completions numbered 963 against 884 in February, representing a daily average of 31 in March against 29 in February. Initial oil production was also at about the same rate as in February, with a total of 3,328,581 barrels in March against 3,050,000 barrels in February. The daily average initial in March was 107,000 barrels against 105,000 barrels in February. East Texas contributed approximately 99 per cent of all the new oil production brought in throughout the United States in March.

Daily average crude oil production for March was 2,157,050 barrels against 2,134,100 barrels in February, representing an increase of about 23,000 barrels a day.

Crude oil production of the United States for the first quarter of this year amounted to 196,768,950 barrels, against 196,033,000 barrels in the same period of last year. Texas, outside of the Gulf Coast is credited with a total production in the first quarter of 66,314,300 barrels, while California produced 45,913,000 barrels and Oklahoma was credited with an output of 38,745,150 barrels.

Lubrication Demand Drops—Stocks Up

DEMAND for lubricating oil in February showed a decline under January of 13,000 barrels a day. Domestic demand aggregated 1,050,000 barrels, against 1,512,000 barrels in January. Stocks of lubricating oil rose to 9,777,000 barrels, from 9,478,000 barrels in January. The rate of production was unchanged, having shown a daily average for both months of 67,000 barrels. Exports for February amounted to 599,000 barrels, against 616,000 barrels in January. The daily average was 21,000 barrels in February against 20,000 barrels in January.

European Markets Lack Stability

BLACK SEA prices were weak again as of March 31, date of the latest quotations available and, as a result, the European price structure was notably lacking in stability.

Undercutting by Russian marketing agencies and small distributors of Roumanian products, not members of the various cartel systems, has so upset the continental markets that retail prices in many countries represent losses to distributors.

In Great Britain, Russian Oil Products, Ltd., is underselling major British and American distributors by 1d. per gallon; and, in Germany, the Soviet marketing organization, "Derop" is underselling its competitors .9 to 1.8 cents per gallon.

The general condition of European markets is illustrated by the situation in Belgium, where an increase in duty equivalent to 1.57 cents per gallon was imposed March 25 and absorbed into the retail price on April 4. Major marketers sought to add the increased tax burden to retail prices by means of an increase effective March 28; but, as the new price was not accepted by distributors of Roumanian gasoline, not members of the cartel, major members of the convention decided to absorb the new tax, effective April 4. Thus, retail price on April 4 was 23.68 cents per gallon (Tax, etc., 13.16).

Two explanations have been offered of the situation existing in Germany, and both seem to be supported by force of logic. One is that "Derop" anticipates the establishment by the German government of some quota system or other method for the control of imports and distribution, such as has been advocated by I. G. Farbenindustrie, believing that such quotas, may be calculated with reference to the division of sharing of the German market as then existing. Believing this, the Soviet marketing agency is said to be exerting every effort to increase its gallonage, so that its quota may be fixed in corresponding proportion.

Another explanation is that the Soviet purchasing agency in Germany is having difficulty in finding German funds with which to discharge heavy obligations for machinery, iron and steel products, and oil well supplies purchased in that country. "Derop's" appetite for gallonage, therefore, is

30 years' experience

behind the Liberty Cleaner

Every dimension, every detail of design in the Liberty Cleaner of to-day has been established through a thirty-year period of trial and test—years which have eliminated and consigned to the scrap-heap many design details, and retained only methods and qualities of positive value.

That is why the modern Liberty Cleaner is depended upon in many refineries for a rapid, continuous job of cleaning tubes in stills and other apparatus. The veteran Liberty Cleaner does not break down under stress, and drives through each tube with a speed that spells dollars in lessened maintenance costs.

Liberty Cleaners

are built in types and sizes to suit any refinery tube cleaning job. If you have an unusual tube cleaning problem, ask us to help you solve it.

Z-1115 b

Put the Liberty to work on your next cleaning job. Check over the requirements in the catalog—on request.

LIBERTY MANUFACTURING CO.
JEANNETTE PENNA.

said to be connected with a struggle for German marks and German exchange for application on the Soviet debt to German industry.

The normal German demand for motor fuel of all types is said to range between 10,089,600 and 12,612,000 barrels per annum, of which about one third has been available from domestic production. Since the expansion of the Leuna plant and the completion of the Misberg refinery, the local supply may be increased to 6,306,000 barrels or 6,726,400 barrels. This would leave roughly 6,300,000 barrels per annum to be divided among the British, American and Russian enterprises now participating in the German market.

Following are examples of European gasoline prices, according to latest available information:

ROUMANIA

	Cents Gold* per U. S. Gallon
Export prices f.o.b. Constantza (Black Sea), as of April 6, 1932.	
Export prices, f.o.b. Constantza (Black Sea)	
Light Naphtha, specific gravity .725-.735 (63.67°-61.02°, A. P. I.)	4.25
Naphtha 60	3.875
Heavy Naphtha, s. g. .730-.740 (62.33°-59.71°, A. P. I.)	3.00
Gas Oil	1.75
Kerosene	1.875

	Cents per Barrel
Fuel, 0° pour, $3.76 per ton, or approximately	53.71

ENGLAND

	Cents gold per U. S. gallon
Motor spirit, premium grade:	
Retail includes excise of 8 d. (12-2/3 cents)	26
To pumpholders	22.17

BELGIUM

Gasoline, average retail price, established April 6, including taxes and duties totalling 13.16 per gallon	23.68

ITALY

Gasoline, representative pump price, including 24c tax	32.

HOLLAND

Gasoline, April 6th, average retail price, including taxes 8.2c	19.78

GERMANY

	Cents Gold per U. S. Gallon
Gasoline, average retail price, including 18.60 pfennigs per liter (approximately 16.89c per gallon) duty, alcohol tax, equalizing tax, and increased turn-over tax	31.12

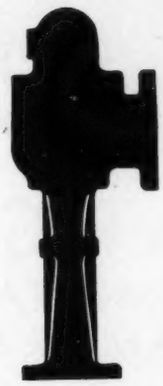
FRANCE

(The following prices are quoted from La Revue Petrolifero, of Paris, issue of March 22, 1932).

Product	A.P.I. Degrees	Net Price Cleared Through Customs House at Rouen (Francs per Metric Ton)	Equivalent Price in Cents Gold per U. S. Gallon (Per Barrel)
Aviation Gasoline	76.59-70.54	1,829.04	18.80
Tourist Gasoline	66.40-63.67	1,652.81	17.73
Light Gasoline	63.67-61.02	1,642.90	17.86
Heavy Gasoline	61.02-58.45	1,586.70	17.49
Ordinary Gasoline	42.12-40.02	1,099.83	13.44
Gas Oil	38.37-32.27	280.87	3.50
Fuel Oil	29.29-22.30	142.40	.802

*Approximate; calculations based on current rates of exchange.

Low absolute pressures may be the means of putting your processes on a much more profitable and productive basis



The equipment is simple..and we thoroughly understand its application . . . . . Ask us

Elliott steam jet ejectors occupy scarcely more space than a pipe fitting, have no moving parts and suffer little perceptible wear in long periods of service. The heat in the operating steam can be recovered. These units can handle corrosive gases. They are efficient and flexible.

The broad experience of Elliott Company in connection with the vacuum requirements of the petroleum industry enables our engineers to apply the steam jet ejector and its allied equipment to your vacuum problems with best possible results. Let us work with you.

ELLIOTT COMPANY

PITTSBURGH, PA.

Industrial Process Dept. · JEANNETTE, PA.

District Offices in Principal Cities

G-287-A

Refined Market Still Moving Upward;

REFINED oil prices have continued to move into higher ground, with U. S. motor gasoline ranging above four cents a gallon in Group 3 and natural gasoline showing more strength than has been apparent for some time.

Kerosenes also continue to move into the higher price zone, with demand becoming brisk in numerous refining centers.

Tank wagon and retail gasoline prices have been advanced throughout a wide area and the momentum is gradually embracing practically all of the East, Middle West, Mid-Continent and Rocky Mountain sections.

It is stated that gasoline price-cutting has broken out anew in the Middle West and also in California. In most instances, however, these outbreaks are of a more or less local character.

Reliable information indicates that many jobbers are still withholding purchases of gasoline and will shortly be forced to place emergency orders for working supplies. This would seem to indicate that last week's decline in gasoline stocks is but the beginning of a series of declines that will shortly begin to make inroads into present large stored supplies.

Not a Tank But a Piece of LIVE PIPE

SARCO THERMOSTATIC STEAM TRAPS

Large, centrally located float or bucket type steam traps may be compared with tanks in which water is cooled. Their size may be impressive, but are they efficient?

Efficient condensers of good hot steam, yes, but when it comes to keeping the heat where it belongs and handling nothing but cool condensate in the return pipes, they cannot compare with Sarco Thermostatic Steam Traps.

These little traps go directly into the pipes like a fitting. They are like a section of LIVE pipe inserted in the returns.

"LIVE" because Sarco Steam Traps will drain all water from pipe lines, coils or jackets as fast as it forms, but will let no steam escape.

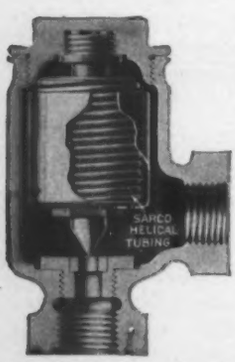
"LIVE" because when Sarco Traps are installed at every point where condensation forms, there can be no "dead" or cold coils or machines due to water logging.

Sarco Steam Traps have only one moving part. They are low in first cost, easy to install and maintain.

It pays to put a separate trap on every coil.

If you are not using them, try one today at our risk.

Write for Catalog S-95 and 30-day free trial offer.



Sarco Steam Trap No. 9-2

SARCO COMPANY, Inc.
183 Madison Ave. New York, N. Y.
Branches in Principal Cities
SARCO CANADA LIMITED, Federal Bldg., Toronto, Ont., Canada
WALKER, CROSWELLER & CO., 20 Queen Elizabeth St., London S. E. 1

Runs to Stills Lower in February

BUREAU of Mines' figures for February show that refinery runs of crude to stills dropped to a daily average of 2,201,000 barrels, from 2,217,000 barrels in January. Total throughput in February was 63,814,000 barrels, consisting of 60,635,000 barrels of domestic crude and 3,179,000 barrels of foreign crude. The January total was 68,715,000 barrels, consisting of 65,371,000 barrels of domestic crude and 3,344,000 barrels of foreign oil.

Motor fuel production was lower than in January, although the rate of recovery rose to 46 per cent, from 44.5 per cent in January. While the daily average amount of crude run to stills was lower in February, the quantity of gasoline produced showed an increase in daily average of 13,000 barrels.

Cracked gasoline production increased in daily average over January to the extent of 18,000 barrels, while straight run gasoline output rose over January to the extent of about 8000 barrels a day.

Gasoline Demand Above Expectations

DOMESTIC gasoline demand in February amounted to 25,508,000 barrels, a daily average of 880,000 barrels. This compared with a daily average in January of 866,000 barrels. While the January and February demand was somewhat less than a year ago, it proved to be greater than earlier estimates indicated. Preliminary figures published in this department in February* indicated that the industry could expect a demand for gasoline during January and February of about 49,630,000 barrels. The cumulative total reported by the Bureau of Mines shows the demand to have been 52,353,000 barrels.

Imports Show Marked Gain in February

IMPORTS of crude and refined products increased materially in February. Total imports of all oil in February amounted to 8,244,000 barrels, against 5,597,000 barrels in January. Crude imports increased 2,661,000 barrels over January, but refined oil imports were 14,000 barrels less than in January.

Exports of all oils dropped to 7,719,-

*Page 90A

American Petroleum Refining

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000 barrels in February, against 8,622,000 barrels in January. Crude exports increased while refined exports showed a decline. Gasoline exports dropped to 2,849,000 barrels in February, from 3,422,000 barrels in January.

Shell Plans Tankers on American Great Lakes

SHELL Oil Company of Canada, profiting by the experience of Shell subsidiaries operating on Maracaibo Lake, in Venezuela, has contracted for the construction in Great Britain of a lake tanker of approximately 17,150 barrels capacity, which will be used in service between Montreal, Toronto and Hamilton. It is said that, if this vessel proves successful, others may be built later.

Pipe Line Motor Fuel Shipments Down

SHIPMENTS of motor fuel through gasoline pipe lines in February decreased to 1,978,000 barrels compared with 2,123,000 barrels in January. Shipments for the first two months of this year totalled 4,101,000 barrels. Stocks in lines and working tanks at the end of the month (February), totalled 1,177,000 barrels as against 1,193,000 barrels at the end of January. There was a shortage in both January and February of 7000 barrels between pipe line intake and outgo of gasoline.

Natural Gasoline Output Declines

NATURAL gasoline production in the United States during February dropped to 132,200,000 gallons as compared to 140,400,000 gallons during January and 152,500,000 gallons in February 1931. Stocks of natural gasoline at the end of February totalled 36,763,000 gallons, an increase of about 3,000,000 gallons in stocks during the month. Production of natural gasoline in the East Texas field, exclusive of the Van field, continued unimportant. Production in the majority of the producing districts in February continued at the same rate as in January. The most notable gain in output was recorded in Texas, exclusive of the Panhandle.

Bureau Report Reviews Gasoline Statistics

THE trend of natural gasoline production, consistently upward since its beginning, showed a marked reversal in 1930, when the output failed to surpass the 1929 total, according to Bureau of Mines report, Mineral Resources of the United States, Part 2, "Natural Gasoline in 1930," by G. R. Hopkins and E. M. Seeley.

The production in 1930 amounted to 2,210,494,000 gallons as compared with 2,233,688,000 gallons in 1929, a decrease of one per cent. In spite of this decline, the United States still ranks far ahead of the other nations in natural gasoline production. In 1929, the latest year for which complete world figures are now available, the United States produced 91 per cent of the world total; however, the proportion produced by the other countries, while small, has grown steadily.

Natural gasoline is unique in that its production is influenced chiefly by the output of crude oil, because the supply of natural gas, the raw material, fluctuates with the activity in the crude-oil fields. In 1930 the output of crude was considerably below the record total of 1929; hence, the production of natural gasoline at the majority of those plants which operate on "wet" or casing-head gas was reduced. On the other hand, the demand

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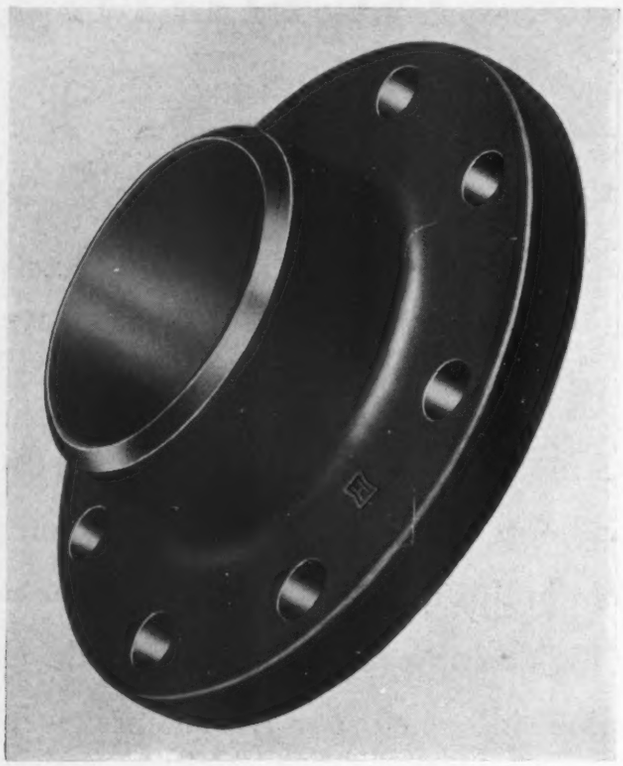

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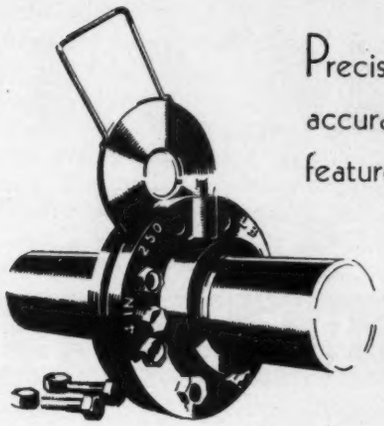
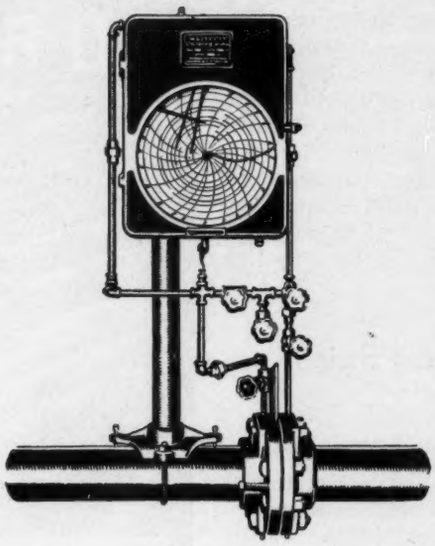


Precise orifices, dependable meters, and accurate, legible records are prominent features of Westcott Orifice Meters.



ALL Metric Orifices are made of cold rolled steel (or other special metal if desired). They are machined accurately with an allowable tolerance of not over one thousandth of an inch. After machining, edges are honed so that they are sharp and free from any microscopic burrs or imperfections. Orifices are then tested with GO and NO-GO gages. Therefore, every orifice of the same diameter will pass the same quantity under the same conditions.

SIMILARLY, every detail in the design, construction, and inspection of Westcott Orifice Meters receives painstaking attention—from the uniform area of mercury chambers and the accuracy and sensitiveness of the recording pen, to keeping moving parts, and consequent maintenance, at a minimum.

A full discussion of the construction, operation and maintenance of Westcott Orifice Meters will be found in Handbook E-2. Positive Integration, a recently developed feature is explained in Bulletin E-16. A copy will be mailed on request.

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for natural gas to supply the large pipe line systems increased in 1930, and since this gas is usually treated before it is turned into the pipe lines the output of natural gasoline rose accordingly. Thus, the increase in the production of natural gasoline in the Texas Panhandle area, the point of origin for a number of large pipe lines, largely compensated for the decline in output at Seminole, the largest producing district and a "wet" gas area. The trend of natural gasoline prices, which ordinarily does not exert much influence on production, tended to restrict the output of natural gasoline materially in 1930, because the price fell to such low levels that many of the small manufacturers were forced to cancel their gas contracts and most of the large companies curtailed the construction of new plants. Another factor in the decline in production in 1930 was the drop in yield due to growth in stabilization. To meet the new specifications for natural gasoline the manufacturers have found it necessary to do more stabilizing, which means that what formerly comprised the lightest ends of their product must now be utilized in some other way.

Texas Anti-Trust Suit Trial in May

ACTUAL trial of the case of the State of Texas against 15 oil companies and two associations will begin May 9. Preliminaries have consumed the time of the court up to the present. With these out of the way, the case is now ready for the taking of testimony before Judge J. D. Moore. Officials of The Texas Company will be interrogated first through a special commissioner.

The Attorney General of Texas is seeking to oust the oil companies on charges of violating the anti-trust laws.

Texas Petroleum Products, and Value

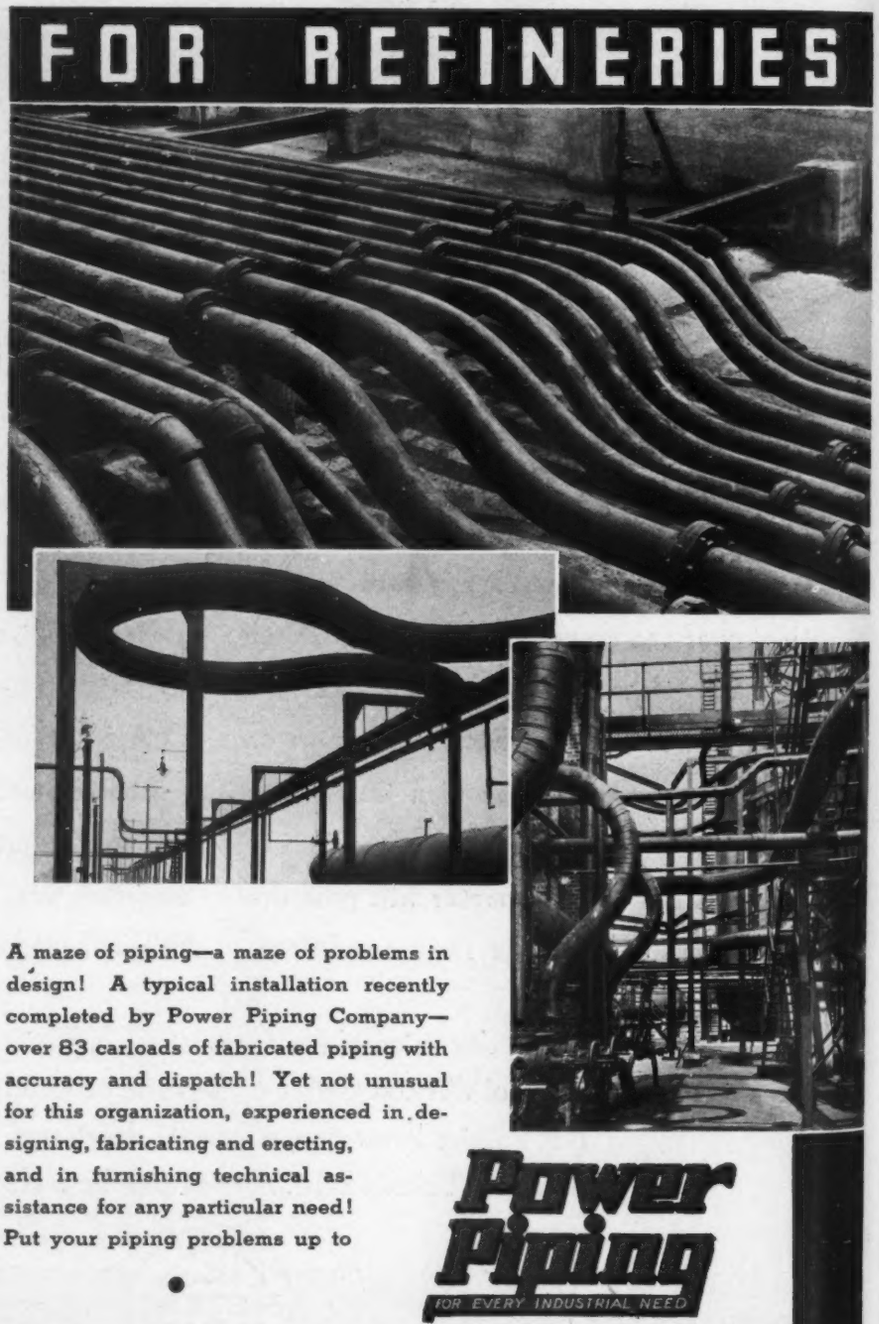
A STATEMENT has been released by the Bureau of Economic Geology of the University of Texas, showing quantities and monetary value of Texas mineral production for the four years 1927 through 1930, the report including figures on petroleum, natural gas, natural gasoline, and sulphur. Data on these four commodities are based on records of the state comptroller.

Petroleum production during 1930 was 290,093,806.13 barrels, valued at $282,313,369.79, according to the report. Gasoline recovered from natural gas amounted to 491,299,000 gallons, with value of $23,596,000. Sulphur was produced by three companies to the amount of 2,558,197 tons, valued at $46,047,546. Production of natural gas as reported by the Bureau of Mines, the report stated, was 517,880,000,000 cubic feet valued at the wells at $18,643,680. This amount is that of which record has been obtained, although it is apparent that a much larger quantity of gas is produced in Texas, the report asserted.

LELAND STANFORD, vice president of Sinclair Refining Company, has returned to New York after a tour of inspection of the company's marketing facilities in western Europe.

Prairie Sinclair Names Live in New Companies

FOLLOWING a meeting of the board of directors of Consolidated Oil Corporation April 6 a number of organization details were announced. The office of chairman of the board has been abolished and the duties assigned to the chairman of the executive committee, to which office H. F. Sinclair was elected. W. S. Fitzpatrick was elected vice chairman of the executive committee, to which were added three additional members: Mr.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Fitzpartick, H. R. Gallagher, president of the corporation, and John H. Markham, president of Petroleum Corporation of America.

Four additional members of the Finance Committee were elected, with E. W. Sinclair as chairman; W. S. Fitzpatrick, H. R. Gallagher, George MacDonald and John H. Markham.

The board of Consolidated Oil Corporation was enlarged by the election of the following directors: W. S. Fitzpatrick, Halstead G. Freeman, Dana H. Kelsey, Clark H. Kountz, J. H. Markham, Hunter S. Marston, Nelson K. Moody and G. T. Stanford. No other changes were made in the board, H. R. Gallagher, having already been elected a member.

Reorganization of the operating subsidiaries of Consolidated Oil Corporation has been effected by the consolidation of the Sinclair and Prairie producing and pipe line operations and the creation of two new subsidiaries for the purchase and sale of crude oil and the administration of gas properties. Officers of all of these units have been chosen from the staffs of the Sinclair and Prairie companies.

In place of the two former producing companies there is now one organization, Sinclair Prairie Oil Company, of which W. L. Connelly is chairman and H. L. Phillips, president. Dana H. Kelsey, who has been elected vice-president of this company, held the same position with Prairie Oil & Gas Company.

The former Sinclair and Prairie pipe lines, will be operated by Sinclair Prairie Pipe Line Company. Clark H. Kountz, formerly vice president of the Prairie Pipe Line Company, has been elected chairman of the newly named company, with John R. Manion, president.

Refining and marketing operations will continue, as before, to be carried on by Sinclair Refining Company. Its principal refineries with a daily crude oil charging capacity of 132,000 barrels are located at Marcus Hook, Pa.; Wellsville, New York; East Chicago; Sand Springs, Oklahoma; Kansas City and Coffeyville, Kansas; Ft. Worth and Houston, Texas. Coming also under the refining company's control is the wholesale and retail distribution system with approximately 2100 bulk stations and 35,000 points of retail distribution, including more than 55,000 pumps. These outlets are exclusive of the company's activities in Cuba, Mexico, and European countries.

Operation of the fleet of ocean tankers aggregating about 120,000 deadweight tons will continue to be carried on by Sinclair Navigation company.

Most important among the newly-organized units is Sinclair Prairie Marketing Company, which will handle the purchase and sale of crude oil. Nelson K. Moody, formerly president of Prairie Oil & Gas Company, will be elected president of this company. With him will be associated members of the staffs of the Sinclair and Prairie organizations.

Another new unit is the Sinclair Prairie Gas Company, of which Mr. Moody will also be president. To this company is assigned the handling of all gas interests.

▼ PERSONALS ▼

Frazer Returns To Oklahoma

W. M. FRAZER has returned to the Mid-Continent refining district to take charge of refinery operations at the Bristow, Oklahoma, plant of H. F. Wilcox Oil & Gas Company. Mr. Frazer was formerly with Marathon Oil Company, superintending operation at the Bristow plant and after resigning was connected with Republic Oil Refining Company as assistant superintendent of its Texas City refinery.

McCay Finds Time For Civic Affairs

EIGHTEEN years ago when Associated Oil Company built its Avon refinery, C. R. McCay, who is now superintendent of the Sand Springs refinery for Sinclair Refining Company, began his experience in the petroleum industry. After some years, he reversed the advice given to young men and traveled east. Accepting a position with the Empire Refining Company at Bartlesville in the engineering department, he remained with that company until 1921 when he became associated with the Pierce Oil Corporation at Sand Springs. In 1926, he was promoted to the position of superintendent of the refinery.

C. R. is a director of the Rotary Club in Sand Springs and of the chamber of commerce. Other activities include a membership in the A.S.M.E. Sports do not interest him to a great extent excepting wrestling and boxing. For these two, he is quite a fan. Fishing, hunting and chasing the little white pill do not claim his time at all.

C. R. McCay

Dayson Heads New Company

SYLVESTER DAYSON, formerly vice president in charge of manufacture for Lion Oil & Refining Company at El Dorado, Arkansas, is president and general manager of Octane Oil Refining Company. The company recently completed a 1500-barrel skimming plant at Chautauqua, near Baird, Callahan County, Texas, on the Texas & Pacific Railroad. J. R. Parten is vice president of the new company and J. R. Pope is secretary-treasurer. J. L. Le Blue is plant superintendent.

A. P. I. Committee on Refinery Technology

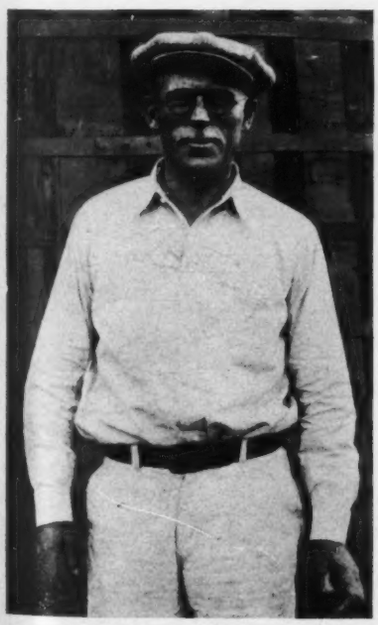
A COMMITTEE of 20, exclusive of chairman and secretary, representing refining branches of the industry in all parts of the country, has been named to constitute the Committee on Refinery Technology for the American Petroleum Institute for 1932. The appointments were made by D. J. Moran of Ponca City, Oklahoma, vice-president and chairman of the Division of Refining of the Institute. Walter Miller, Continental Oil Company, Ponca City, is chairman of the Committee on Refinery Technology and Dr. R. P. Anderson, American Petroleum Institute, New York, is secretary. Others named to the committee are:

D. G. Brandt, Henry L. Doherty & Company, New York; H. W. Camp, Empire Oil & Refining Company, Tulsa; S. P. Coleman, Humble Oil & Refining Company, Houston; T. G. Delbridge, The Atlantic Refining Company, Philadelphia; R. A. Halloran, Standard Oil Company of

California, San Francisco; R. E. Haylett, Union Oil Company of California, Los Angeles; F. E. Holsten, Barnsdall Refining Company, Tulsa; E. R. Lederer, Texas Pacific Coal & Oil Company, Fort Worth; N. E. Loomis, Standard Oil Company of New Jersey, Elizabeth, N. J.; K. G. Mackenzie, The Texas Company, New York; John W. Newton, Magnolia Petroleum Company, Beaumont; R. C. Osterstrom, The Pure Oil Company, Chicago; L. W. Parsons, Tide Water Oil Company, Bayonne; A. E. Pew, Jr., Sun Oil Company, Philadelphia; D. Pyzel, Shell Oil Company, San Francisco; J. B. Rather, Standard Oil Company of New York, Brooklyn; H. G. Smith, Gulf Refining Company, Philadelphia; F. W. L. Tydeman, Shell Petroleum Corporation, St. Louis; L. B. Van Leuven, Vacuum Oil Company, New York; and R. E. Wilson, Standard Oil Company (Indiana), Chicago.

Hunter Solved His Corrosion Problem

AFTER graduating from the Colorado School of Mines at Golden, with the degree of Mining Engineer, Carl A. Hunter followed Horace Greeley's advice and went west. Accepting a position in the engineering department of the General Petroleum Company, he stayed with that organization from 1917 until 1928 when he came back to the Panhandle of Texas with Dixon Creek Oil & Refining Company.



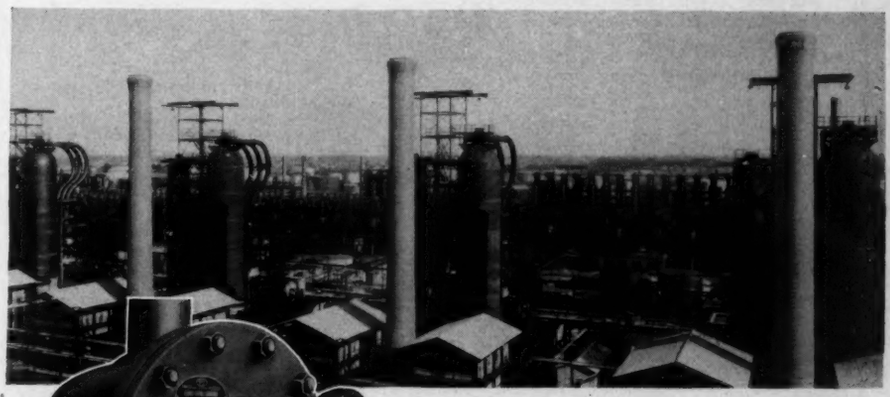
CARL A. HUNTER

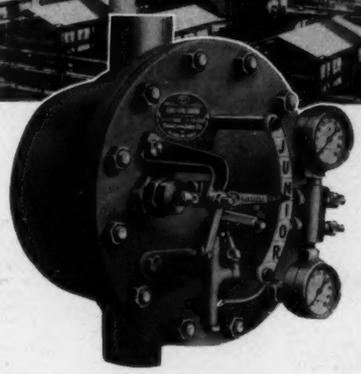
At that time several gasoline plants were in operation and the Dixon Company was contemplating a refinery. Selecting a site a few miles from Kingsmill in the Pampa area, this plant was placed in operation and Carl was made refinery manager taking charge of refining and marketing of the product. Working with the large wheat farmers, he developed a fuel refined from crude produced near the plant which was suitable for operating the tractors and combination harvesters used extensively in that section of the country.

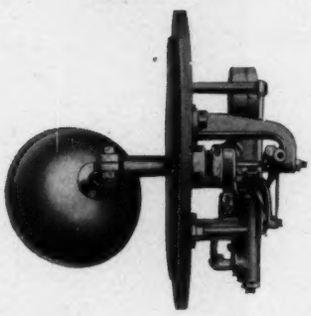
Corrosion problems are many in refining a sulfur laden crude such as is processed through his plant, and to minimize the shut-downs incidental to vapor line and condenser failures, he applied a system devised by his chemist whereby zinc oxide is introduced directly into the vapor stream. Over a period of months after this method was first applied there was not an appreciable amount of corrosion of either vapor lines, admiralty metal condensers, or run down tankage.

Wrightsman Heads Standard of Kansas

C. B. WRIGHTSMAN was chosen president of the Standard Oil Company of Kansas at the stockholders meeting at Neodesha, Kansas, March 9, succeeding A. S. Hopkins, who was







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Very sensitive control conditions are maintained by use of the S & J Master Control, which has been constructed for extremely light buoyancy. Positive throttling action for any desired process is obtained by using S & J Controls in conjunction with S & J Diaphragm Valves. Both Master and Junior models are readily adapted to use of remote electrical signal lights, and are furnished less pot for mounting directly on manhole cover plate, of a size to accommodate dimensions of open nozzle on container. Manufactured for 50, 150, 300, 450 and 1000-lb. pressures. Higher pressures on order. Send for Bulletin No. 50A for full details of this outstanding level control system.

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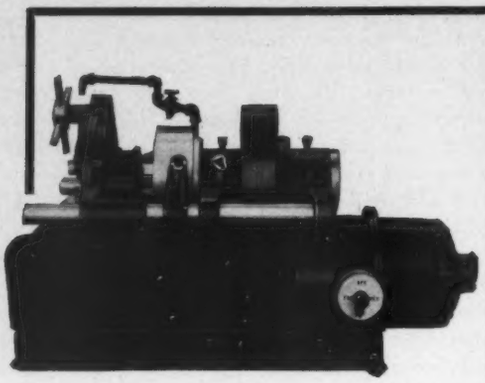
Light, compact, strictly portable, yet built strong and sturdy for years of hard service.

Circular and price on request.



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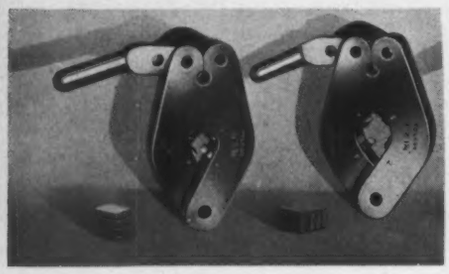
—the dies are released and the die head instantly pulled off the completed thread.

These most desirable, efficient quick-opening die heads with rake-type dies can be furnished with new No. 999s, or installed on your present machine with only a slight change necessary.

Bolt dies, or conduit dies may also be supplied.

We will be glad to furnish circular and prices.



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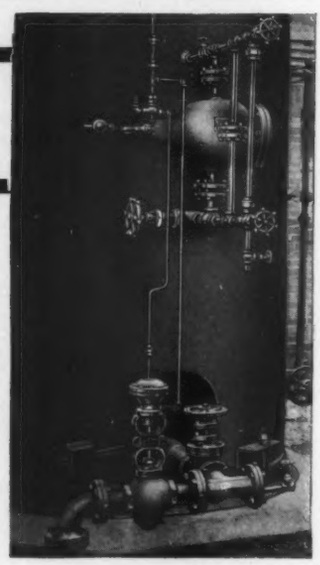

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elected vice president. E. A. Warren was re-elected a vice president and H. G. Lea was named secretary-treasurer. Drilling and producing operations will be directed from a new company office being opened at Wichita, Kansas, by Mr. Wrightsman. Executive offices of the company will remain in Neodesha. Further modernization at the refinery is contemplated.

Heinrich Organizes Engineering Firm

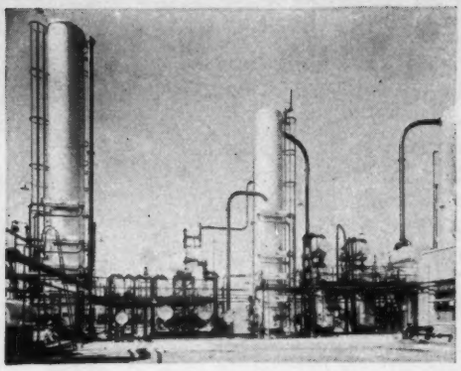
E. T. HEINRICH has organized the Heinrich Refinery Process Corporation to carry on general refinery constructing and consulting services. Mr. Heinrich is president of the company. Offices are located at 11 South La Salle Street, Chicago.

Blending Hot Makes Better Product

R. C. BURNS, superintendent of the Smackover refinery of Simms Oil Company believes that a man should dig out the possibilities of his equipment, find out when running a certain class of crude whether anything may be done that will improve the throughput rate without increasing the cost of processing materially, or improve the product derived therefrom. Having to deal with the heavy Smackover crude which he is skimming, then cracking gas oil in the two Cross units, he got his think tank going to find out why, when and how he could improve the viscosity of the fuel oil remaining after he had taken out all the gasoline fractions that were to be had under his operating conditions.

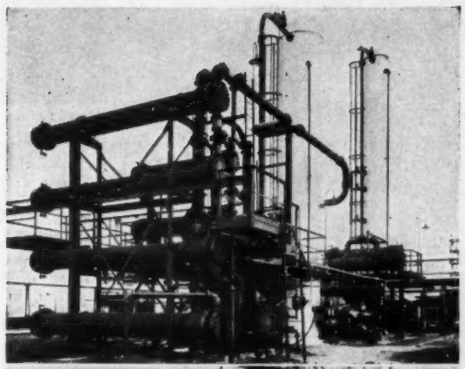
Setting a second flash tower on the outlet of the one from which he is taking gas

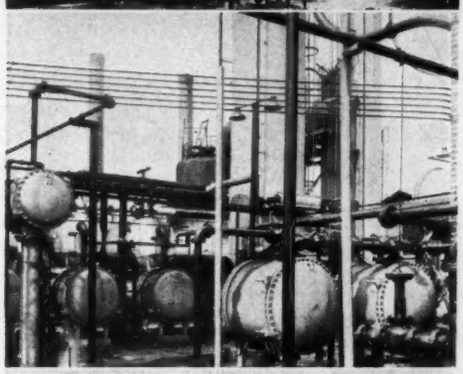
R. C. BURNS

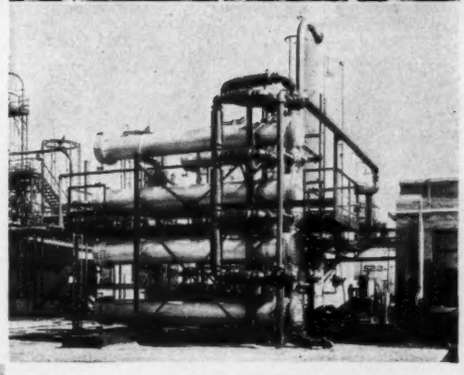


Wilgus — N. G. E. Precision Pilot Liquid Level Controllers were installed in eight out of eleven modern stabilizer and debutanizer plants recently built — of which these four are typical examples.

Now LIQUID LEVEL CONTROLLERS ARE NOT ALL ALIKE!







WILGUS—N. G. E. Precision Pilot Liquid Level Controllers were installed throughout in eight out of eleven stabilizing and debutanizing plants recently built—four of which are shown—for one reason only:

This equipment is as provably superior to other types as today's high octane rating gasoline is better than yesterday's motor fuels.

By the unique "pressure balance" principle, utilized only in the Wilgus—N. G. E. *Precision Pilot,* the operating fluid—air, gas, or liquid—is admitted to or relieved from the diaphragm operating the main valve *in direct and exact response to changes in the liquid level.*

There is no continuous flow of the operating fluid . . . no venting through a small orifice or needle valve . . . no waste or hazard from escaping gas . . . no possibility of clogging a small opening with a slug of moisture and disturbing the operation of the system . . . no stuffing boxes or other parts to require frequent attention.

Hunting or over-riding of the main valve are eliminated, and speed and sensitiveness of response are increased, because the pilot responds directly to varying submergence of the float, practically without motion of the float arm and related mechanism.

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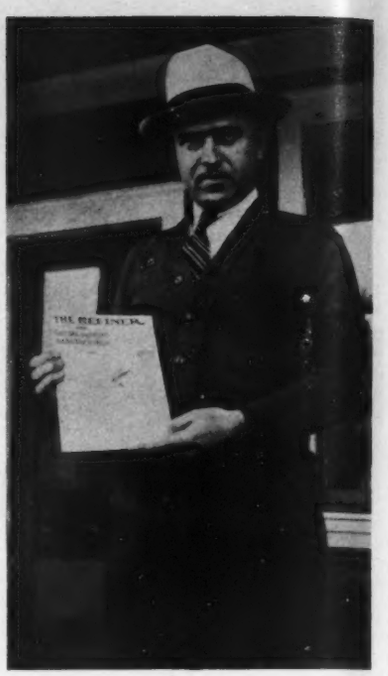
oil, he has accomplished that which he has been working for. Blending the two fuels, the residuum from the Cross units and that from the skimming plant, the mixture results in a better grade of fuel than that which is turned out when blended cold.

Burns went through the Burkburnett boom with Constantine who had a refinery at Devol just across the river on the Oklahoma side. He was assistant superintendent in that plant from 1918 until 1923. For the past four years he has been with Simms Oil Company at Smackover. Although his plant is situated near a cypress swamp, there is no evidence of alligators in the yard—neither is there any evidence in the yard that weeds will grow in Arkansas.

Eells Charter Reader And Can Prove It

DON EELLS began his work in the oil fields way back in '14 with Indiahoma Refining Company, in the production department, in the Cushing area. He was with Oklahoma Refining Company, later with Cushing Refining Company, and in 1916, started with Empire Oil & Refining Company. He has been superintendent of the Okmulgee, Oklahoma, plant for a number of years. Although inclined to be a "gypsy," he has managed to stay in one place for a long time. The roving spirit is satisfied to some extent during vacations when he takes his family on long drives over the various parts of the country. On days which he can do so, he fishes, not the scientific Isaac Walton stuff, but as he says, just plain 'nigger fishin', a pole and line, and usually with success.



DON EELLS

Seldom will you see a superintendent so interested in his trade journals that he will faithfully file them away, even to copies of the first edition. Eells has preserved a copy of the first issue of the REFINER, one which carries on the first page a picture of the stork carrying the new son which was born to the Gulf Publishing Company on September, 1922.

Richfield Forms Engineering Subsidiary

THE Vapor Treating Processes, Inc., has been incorporated as a subsidiary company of Richfield Oil Company of California for the purpose of licensing the Lachman (zinc chloride) continuous vapor phase treating process. This process was developed at the Hynes refinery of Richfield Oil Company and was described in detail in REFINER AND NATURAL GASOLINE MANUFACTURER, issue of November, 1931, page 72.

DAN NEWTON, who was president of the Newton Process Company, which sold out in 1929 to Southwestern Engineering Corporation, visited the exposition at Los Angeles March 25. He is now living at Fullerton California, playing golf five days a week, and taking things easy.

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PLANT ACTIVITIES

REFINERS continue to expand facilities for manufacture of high anti-knock value motor fuels. The present vigorous campaign of construction exists under a peculiar condition wherein the industry is spending millions to produce more gasoline of better quality and to process less crude by 40,000,000 barrels than last year.

A review of the following "Plant Activities" and those published in recent months in these columns indicates something of the magnitude of the work underway. By far the majority of news notes relating to construction report enlargement and extension of cracking. This, in most refineries is followed by installation or enlargement of gasoline recovery and stabilization systems. Steam generating departments also are receiving attention this year. Chemical treating systems, water circulation systems, are being enlarged in a number of refineries and many are installing new tankage other than tanks necessary to the operation of the new cracking units.

Some of the larger concerns have announced or have already launched major expansion programs affecting a large number of refineries. It is anticipated that East Coast refineries will soon begin another expansion of cracking facilities, likewise plants in the Chicago area are scheduled to see further additions to the cracking departments and persistent rumors exist indicating another major refinery in the Chicago territory and possibly another plant for one of the Erie Lake shore cities. California refiners are also planning expansion of their cracking departments.

The industry is rapidly getting in position where its operations will yield as much cracked as straight run gasoline, and current factors contribute to the belief that this will not be sufficient to meet the growing demand for cracked fuels, and it appears that conditions actually indicate a need for the production of more cracked gasoline than existing and building facilities will produce. Every existing factor influencing the refining industry points definitely to the fact that the refinery without cracking equipment must soon install such systems.

New Construction

Reconstruction

Anderson-Pritchard Oil Corporation, Oklahoma City, Oklahoma, plans early reconstruction of that part of its Cyril, Oklahoma, refinery, recently destroyed by fire. Estimated cost is $80,000.

Stabilizer

Champlin Refining Company, at its Enid, Oklahoma, refinery is to modernize the recovery system through addition of a stabilization unit.

Lube Plant

Crude Oil Hydro Refining Corporation (John C. Gray, president), 925 Main Street, Bridgeport, Connecticutt, has leased a 25-acre site at Ledyard, Connecticut, upon which it plans erection of a plant for manufacture of lubricating oil, at cost estimated from $25,000 to $50,000. George Bilderbeck is engineer in charge.

Refinery

The Chilean Government, which has for some time been active in endeavoring to establish a refinery, reserving by law the right to construct and operate such a plant, now appears nearer realization of such plans. There is no large petroleum refinery in Chile although five very small units are reported with a total charging capacity of only 465 barrels (based on one charge per still regardless of time involved in refining). Enrique Costabal who has been in the United States since September, 1931, returned to Santiago, Chile, March 26, where he is acting in an advisory capacity to the government on oil affairs.

Stabilizer

El Dorado Refining Company, El Dorado, Kansas, is erecting a new vapor recovery system and gasoline stabilizing unit. Soars and Lovelace, Inc., are engineers.

Refinery

Joseph Elie, Ltd., independent oil company, Montreal, Quebec, Canada, has announced that in the near future the company will erect a new refinery in Montreal East, near the plants of British American Oil Company. Estimated cost is reported at $1,000,000. Company address is 393 Hibernia Road, Montreal.

Reforming Unit

Garber Refining Company, Garber, Oklahoma, is engaged in a modernization program involving the erection of a Winkler-Koch, vapor-phase, gasoline reforming unit with a capacity of about 1900 barrels daily. A Jackson Engineering Company (recently acquired by Alco Products, Inc.) stabilizing system is installed. New continuous sulfuric acid treating system and continuous sweeting systems are being installed. The Lachman (zinc chloride) treating process reported in these columns (Ref. & N.G.M. Jan. 1932, page 65A) is to be installed later.

Cracking Unit

Eugene F. Griswold and J. J. Thomas, according to St. Louis reports, have secured a 10-acre tract at East St. Louis, Illinois, adjacent to Aluminum Company of America's plant there, on which they will erect a cracking plant for processing low-priced reduced crude, possibly from East Texas refiners, moving it to Illinois via Missouri Pacific Railroad. Griswold is the organizer of Central Texas Refining Company (10,000 barrel plant at Friars Switch, near Henderson, East Texas field), and J. J. Thomas has been associated with Burford Oil Company, both at Pecos, Texas, and at the subsidiary, East Texas Refining Company, plants, and has been in charge of construction and operation.

Repairing

Great Southern Producing & Refining Company's skimming plant near Shreveport, Louisiana, is under going repair and according to J. D. Blanton, in charge, may resume operations using East Texas crude delivered by tank cars. Plant capacity is 1000 barrels.

Distillation Unit

Hancock Oil Company, at Long Beach, California, has completed construction and is operating a new topping unit, which adds capacity to the refinery to total about 12,000 barrels daily.

Cracking Unit

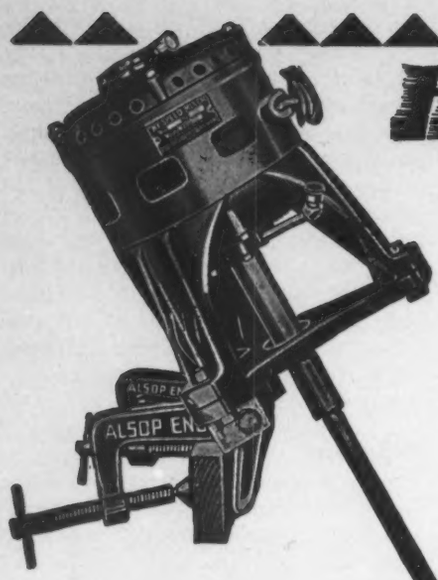
Jenson Oil Refining Company, McIntyre Building, Salt Lake City, Utah, has started preparation for the erection of a 1000-barrel cracking unit at its Ogden, Utah, refinery. Refinery capacity is 2000 barrels. J. B. Jenson is general manager for the company and W. G. Stearns is in charge of refinery operation.

Cracking Units

Magnolia Petroleum Company, in addition to reconstructing and modernizing its cracking equipment at the Fort Worth, Texas, refinery (Ref. & N.G.M. Feb. 1932, page 71A) is reported to have signed contract for the erection of two additional large cracking units to be erected at the Beaumont, Texas, refinery.

Refinery

Mentone Oil & Refining Company, which maintains headquarters at Mentone, Texas, has acquired the 225-barrel daily capacity skimming plant erected last summer by the Lovco Refining Company in the Wheat pool, West Texas, and have moved the plant to Arno, nearest railroad point to the field. A crude line and tank car loading rack formerly used by Lockhart & Company, El Paso, in shipping crude from the Wheat pool, has been made available for the Arno plant. E. F. Barker, Jr., is president of the Mentone Oil & Refining Company, and H. C. Chaddick is vice-president and plant superintendent, both having formerly been identified with Central Refining Company's skimming plant in the East Texas oil field.



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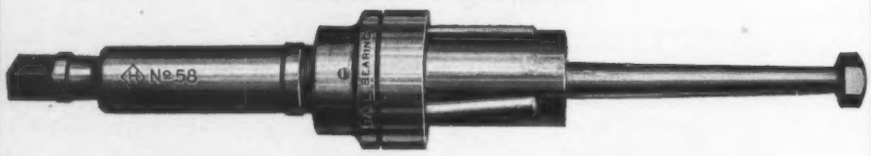

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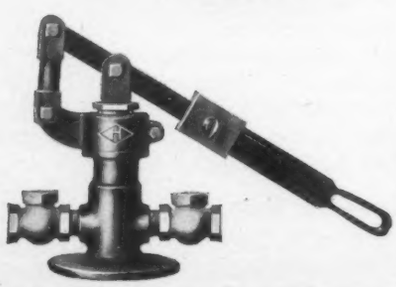
Tube Expanders for Pipe Work
Screw Punches for Plate Work
Flaring Tools for Still Tubes
Beading Tools for Still Tubes
Hydraulic Jacks
Hydraulic Punches



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Cracking Units

Midwest Refining Company is enlarging cracking departments at its Laramie, Graybull, and Casper, Wyoming, refineries. The new units now under construction are of a design developed by engineers of Standard Oil Company (Indiana).

Refinery

Mohawk Petroleum Company, Bakersfield, California, according to California reports has let contract for construction of a 1500-barrel skimming plant at Fruitvale. The plant, to be completed in about two months will establish a new outlet for Fruitvale crude.

Gasoline Plant

Peppers Gasoline Company, Enid, Oklahoma, has let contract for erection of a new well-pressure plant to process gas from the Oklahoma City field, to Petroleum Engineering, Inc., Tulsa. Various units are now being fabricated. Plant capacity is 40,000,000 cubic feet daily.

Cracking

Phillips Petroleum Company, according to reports, is planning to enlarge its cracking departments in its refineries at Okmulgee, Oklahoma, Borger, Texas, and Kansas City, Kansas. General modernization and improvement of distillation, cracking, reforming and gasoline recovery and stabilization systems is included. The company will lay a six-inch pipe line from the Oklahoma City field to its Okmulgee refinery.

Refinery

Seaboard Oil & Refining Company, Ltd., is preparing a site at North Vancouver, British Columbia, Canada, upon which it will erect a 3000-barrel refinery. Construction work is to be completed this summer. Distillation equipment will be erected by Southwestern Engineering Corporation. Company headquarters are at 110 Water Street, Vancouver. D. B. Boyd is president and C. W. Durbrow and E. R. Sheldon are vicepresidents. Frank A. Milliff will have charge of construction and operation of the plant. Mr. Milliff was formerly identified with Marine Oil Company, Los Angeles.

Cracking Unit

Shell Petroleum Corporation, at its Deer Park (Houston Ship Channel), refinery is getting well under way in construction of its new cracking facilities. The company is also erecting a gasoline recovery and stabilization system, also tankage and other auxiliaries. Estimated cost is $700,000.

Remodeling

Sherwood Refining Company, Brooklyn, New York, which recently took over the

Mutual Refining Company plant a Warren, Pennsylvania (Ref. & N.G.M. March, 1932, page 73A), has been remodeling and enlarging through the addition of a barrel house, new agitators and new filters. Capacity is 750 barrels daily, producing gasoline, lubricating oil, petrolatum and white or medicinal oils. The company is a subsidiary of Sherwood Petroleum Company, Inc. H. H. Sherwood is president, H. H. Watkins, vice-president, G. D'Amore treasurer, J. W. Jackson, secretary. Elmer Peters is general manager of refineries and Dr. R. R. Rosenbaum is chief chemist.

Vacuum Unit

Skelly Oil Company is reported installing an asphalt-vacuum distillation unit at its El Dorado, Kansas, plant. Alco Products Inc. is directing the work.

Distillation Unit

Southern Oil & Refining Company, headed by L. H. Gray, is reported planning the addition of a 700-barrel distillation unit at the company's refinery at Reed's Switch, on the I.-G.N. Railroad between Kilgore and Overton, East Texas field.

Cracking Unit

Standard Oil Company (Indiana) began construction work on its replacement cracking unit at the Casper, Wyoming, refinery on March 7. The unit will have a charging capacity of 6500 barrels per day, and was originally reported as Cross type. M. W. Kellogg Company is erecting the unit using labor consisting mostly of company men formerly out of employment. (Ref. & N.G.M. Jan. 1932, page 66A and Nov. 1931, page 149.)

Recovery System

Standard Oil Company of Kansas at its Neodesha refinery is including in its program of modernization (cracking department) a Winkler-Koch Engineering Company stabilization system.

Refinery

United British Oilfields of Trinidad, Ltd., Trinidad, proposes spending about $500,000 for a new and larger refinery and loading terminals. The old plant was erected in 1915 and is of obsolete design, necessitating reconstruction.

Recovery Plant

Utah Oil Refining Company, Salt Lake City, is to construct a new gasoline recovery and stabilization system at its Salt Lake refinery, and will improve cracking and other departments at a reported cost of $400,000.

Reconstruction

United States Refining Company, Osage, Weston, County, Wyoming, owned by Egaso Operating Company, is preparing to recondition, enlarge and resume operation,

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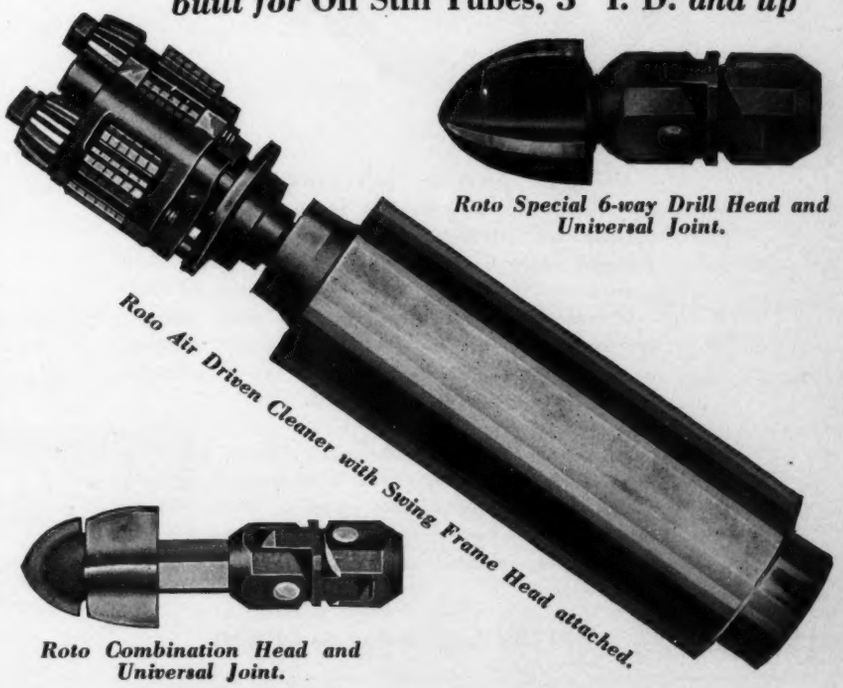

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according to reports which state further that the Egaso owned plant has been leased by H. H. Swartz, president, Arro Oil & Refining Company, Lewistown, Montana, and associates. The plant capacity is reported at 1000 barrels, and is equipped with a Cross cracking unit.

Refinery

Vicker Petroleum Company, Wichita, Kansas, is to start immediate construction of a 1000-barrel refinery adjoining the townsite of Raymond, Rice County, Kansas, on the Santa Fe Railroad. The company has crude production in this area and will process its own oil. The company owns a 3500-barrel plant with cracking facilities at Potwin, Kansas.

Lube Plant

Yacimientos Petroliferos Fiscales (Argentine Government) at its La Plata, Argentina, South American, refinery plans immediate expenditure of $1,250,000 for construction, enlarging the plant and erecting a 400-ton lubricating oil manufacturing system, according to announcement by Minister of Agriculture de Tomaso. The refinery has a rated capacity of 13,000 barrels and is equipped with cracking units. Address is Calle Paseo Colon, 922 Buenos Aires, Argentina.

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Resuming

Arro Oil & Refining Company, Lewistown, Montana, plans to resume operation early in April after having been closed down during the winter months. The plant has a rated crude capacity of 2000 barrels daily.

Dismantling

Associated Oil & Refining Company's old plant at Oil City, Louisiana, has been acquired by C. Hodges who is dismantling it and selling the equipment. Original capacity was 5000 barrels daily. Part of the distillation equipment and 10,000 fire brick were sold to George Centers, who recently acquired the Nacogdoches, Texas, plant of Nacogdoches Refining Company.

Resumes

Dale Oil & Refining Company, Electra, Texas, after a short shut-down period to make repairs and additions, has resumed operations. Capacity is 6000 barrels, operating at 2000 barrels. The company will move its executive offices from Wichita Falls to Electra, Texas.

Operating

Guillory Refining Company has completed construction and started operating its 500-barrel skimming plant, located near production on the northeast edge of the town of Kilgore, East Texas field. This increases the number of plants within and adjacent to the field to 19—seven of which are idle.

Acquisition

Shamrock Oil & Gas Company has acquired the refinery erected last year by Apache Refining Company, Sunray (near Pampa), Texas, according to late reports and will recondition the plant and resume operations. The refinery was erected with a 4000-barrel capacity to operate on crude from Sunray Oil Company properties.

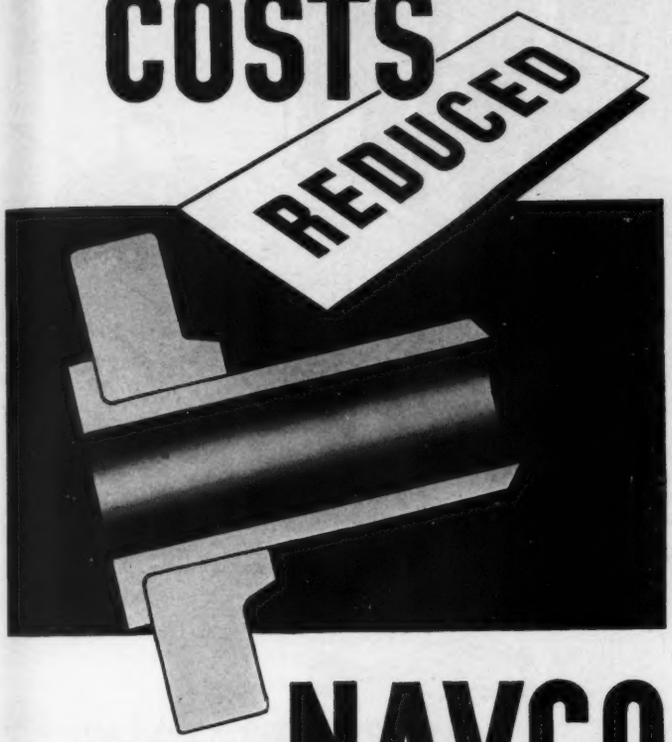
Contact Clay

Texas Pacific Coal & Oil Company recently announced that its subsidiary, Thurber Earthern Products Company, has opened up a large deposit of high grade Bentonite or filter clay, near Woodward, Oklahoma. Complete crushing and drying equipment has been installed and shipments started March 11. The clay is reported to be excellent grade for contact filtration work.

Purchase

Western Oil Corporation, Tulsa, has purchased from Tidal Refining Company the remaining three-fifths interest in the jointly owned skimming plant and two natural gasoline plants at Burkburnett, Texas. The 2000-barrel refinery has been shut down for several years.

ERECTION COSTS REDUCED



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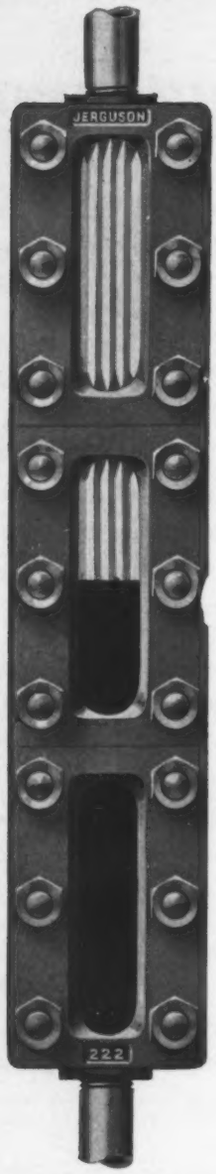

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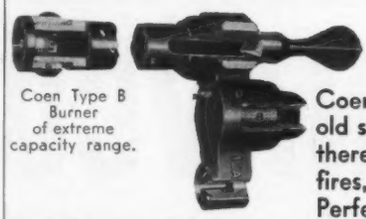

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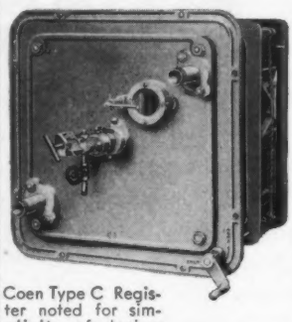

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SCIENCE AND TECHNOLOGY

Abstracts prepared in co-operation with the
REFINER AND NATURAL GASOLINE MANUFACTURER
by
THE LESLIE LABORATORIES
Tarver Road, Ann Arbor, Mich.
under the supervision of
DR. E. H. LESLIE and DR. H. B. COATS

The abstracts here presented are selected from the current literature of science and technology to afford reference to fundamental information not easily available to all readers. Abstracts of articles appearing in readily obtainable trade journals are not included.

Photostat copies of original articles will be supplied at cost by the Leslie Laboratories. Complete or limited bibliographies covering special topics by title, by abstract, or in complete manuscript, will also be prepared and furnished at reasonable cost by the Laboratories.

Fundamental Physical Data

Heat Content of Petroleum — Oil Fractions at Elevated Temperatures. H. M. WEIR and G. L. EATON. *Ind Eng. Chem.* **24** (1932) pp. 210-18.

Data of fundamental importance are presented covering the heat content of five oils in the liquid state and in the vapor state over various ranges of temperature up to 1004°F. The effect of pressure on heat content was also studied and data are presented on the heat content of a naphtha over a wide range of temperature and under pressures from atmospheric to 2000 pounds. The apparatus and methods used are described and the data presented in the form of tables, curves, and equations. The oils used were from Mid-Continent crude and included naphthas, kerosene, gas-oils, and a lubricating oil stock. One of the gas oils was a typical cycle-stock. The data are correlated with previously determined data covering restricted temperature ranges. A few critical data are included. The value of this work cannot be overstressed.

Thermal Expansion of Gasolines. C. S. CRAGOE and E. E. HILL. *Bur of Stds. Jour. of Research Vol.* **7** (1931) pp. 1133-49.

Temperature density data were taken from which the coefficients of expansion of straight-run, cracked gasolines, motor benzols, and benzol blends were calculable for the range 32°F. to 86°F. These differ slightly from the data of Bur. Stds. Circular No. 154, which has been the source of reference for this information. This circular included no data on benzol or benzol blends.

Conductivities of Low Order in Hydrocarbons and Transformer Oil. L. A. WELO. *Physics* **1** (1931) pp. 160-70.

Transformer oil and other hydrocarbons studied have a conductivity of the order of 10^{-19} ohm^{-1} cm^{-1}

Chemical Composition And Reactions

Nuclear Syntheses in the Olefine Series. III. Hexenes. C. G. SCHMITT and C. E. BOORD. *Jour. Am. Chem. Soc.,* **54** (1932) pp. 751-61.

A continuation of valuable studies of the synthesis and properties of the olefins. Ten of the 13 possible hexene isomers have been prepared through use of the B-bromo ethers. The properties of these hexenes and of the bromo ethers and dibromohexanes are given.

Latest Investigations on the Composition of Crude Oil. J. VON BRAUN. *Z. Angew. Chem.* **44** (1931) pp. 661-4.

Sulfur in crude petroleum is present in different compounds than in petroleum distillates because of chemical changes resulting from heating. Nitrogen compounds in crude probably have the character of albumins, but not in distillates. The oxygen compounds, represented by the naphthenic acids are monocyclic below a molecular weight of 200-210 and bicyclic above this. The acids of seven carbon atoms contain some paraffin carboxylic acids. The presence of the group $-CH_2$ COOH in the cyclic acids was established by the reaction with PCl_5.

Manufacture: Processes and Plant

Reaction Velocity Constants of Oil Cracking. J. C. GENIESSE and R. REUTER. *Ind. Eng. Chem.* **24** (1932) pp. 219-22.

The paper presents interesting comparisons of reaction velocities over a range of temperature for the atmospheric-pressure cracking of a typical Mid-Continent gas oil, several naphthas and cracked distillates, and several saturated and unsaturated hydrocarbons. The reaction rate in cracking gas oil doubles for an increment of 25°F. at 840°F. and for an increment of 38°F. at 1110°F. Pressure-cracked naphtha cracks more easily than straight-run naphtha. Rates of cracking increase, in general, as molecular weight increases. The activation energy for decomposition is the same for all the hydrocarbons and petroleum fractions except ethylene and is of the order of 53,400 calories per gram molecule. A bibliography is included.

The Crystallization of Paraffin Wax. Part II. E. KATZ. *Jour. Inst. Petroleum Tech.* **18** (1932) pp. 37-52.

The author briefly reviews the explanations given by previous investigators of the formation of plate and needle crystals of paraffin wax with which, in the main, he differs. Dealing with the wax contained in wax distillate the experimental work conducted showed that the development of crystals of one form on the other depended only on the concentration of paraffin in any particular solution and on the temperature at which crystals first formed. The concentration at which plates cease to exist and needles begin to form is termed the "concentration of change" and the saturation temperature at this concentration the "temperature of change." To obtain needles from a solution that crystallizes in plates the concentration of paraffin must be increased or the nature of the solvent medium changed to one having a lower concentration of change. Plate crystals may form under the conditions existing in pressing wax distillate, but the same wax forms needle crystals in the sweat pans if melted and cooled, thus facilitating the oil separations in sweating. A bibliography is included.

The Characteristics and Manufacture of Paraffins. M. BESTUZHEV. *Erdol und Tar* **7** (1931) pp. 270-4, 255-7, 301-6.

By use of a special filter press equipped with a cooling system capable of maintaining a constant temperature, the influence of temperature and of amount and duration of pressure on the quality of the slack wax made were investigated. Criteria of cake quality were the percentage and m.p. of the slack wax and the pour point of the pressed oil. Raising the temperature at constant pressure and time increases the percentage of paraffin in the cake. The rate of filtration and the capacity of the press are lowered rapidly as the operating temperature is lowered. Pressure and the duration of its application influence the quality of the cake to some extent. Filtering time is reduced 25 per cent to 50 per cent by doubling the pressure. Pressures up to 50 atm. are desirable. Rapid application of the pressure results in a cake of better quality than gradual increase of the pressure to the same maximum value. Plate thickness affects the speed of filtration; thicker cakes requiring a longer time for production of slack wax of a given quality. Plates thicker than 20 mm. are not practical.

A tabulation is given showing the quality of wax obtained from oils of different viscosities. The oil viscosity should be low, not exceeding 2.0 Engler at 50°C., and the oil should be a wide boiling fraction.

The effect of time and temperature on sweating is discussed. A tabulation is given showing the yield and quality of the wax from slack waxes of different oil content. The determination of oil in wax by the penetration method is discussed. Sweating under reduced pressure results in higher oil yield. The effect of presence of paraffins of different m.p. on the quality of the final wax product is discussed.

The presence of "ceresin" has a marked ef-

fect on the crystal structure of paraffin, upon oil distribution, and reduces crystal size. Rapid cooling of pure paraffin results in small ceresin-cake crystals. Although the presence of a small proportion of ceresin does not greatly alter paraffin crystal structure, it greatly lowers filterability. In the distillation of crude with shell stills without rectification the wax distillate contains some ceresin. The conclusion is drawn from laboratory and commercial scale experiments as well as from American practice that rectification is necessary in separating wax distillate. Cracking should be avoided.

Manufacture of Asphalt from Cracking-Process Residues. F. M. H. TAYLOR. *Institution of Chem. Eng.*, Dec. 1931, 16 pp.

The air-refining process was preferred to the steam process because of higher yield, more easily controlled end point, and the fact that the reaction is maintained by its own heat. An agitator type of reaction vessel gives increased throughput for a given size of plant, avoids overheating, results in more complete oxidation and polymerization of the lighter oils before they are removed by distillation, and requires less air and fuel. A tower with a spray gives good enough contact for commercial operation. A flow chart and layout diagram are given together with details of practical results.

Products, Properties And Utilization

Fuel Line Temperatures in Cars of 1931. O. C. BRIDGEMAN and H. S. WHITE. *Jour, S.A.E.* **29** (1931) pp. 447-52.

This survey is the second of its kind, following a similar one in 1930. Four variables are involved, two of which are controllable, namely, vapor pressure of the gasoline, design of the fuel system, atmospheric temperature, and altitude or pressure. Relationships between the vapor pressure of the fuel and the vapor-locking temperature are given, for example

$$t = 259 - 140 \log P_r$$

in which, t = vapor locking temperature in degrees F. and P_r is the Reid vapor pressure at 100°F.

For change of altitude there is an almost straight line drop of 2.2°F. in the vapor-locking temperature for each 1000 feet. The permissible Reid vapor pressure of gasoline for use at an altitude of 10,000 feet is given by multiplying the Reid vapor pressure at 100°F. by 0.833.

Of 47 cars examined, 40 had fuel pumps, five vacuum tank, and two gravity feed systems. The important temperatures are the fuel-pump inlet, vacuum tank outlet, and sediment bowl or tank outlet for gravity systems. Data are given in tabular and graphical form for the rise of temperature at various speeds and atmospheric temperatures are given for the 47 cars. At 40 m.p.h. this rise varies from 4°F. to 54°F. On idling after 40 m.p.h. the rise was 27°F. to 80°F.

No material improvement has been made during 1931. The average temperature rise was 30°F. in 1931 as against 32°F. in 1930. Vapor-pressure was 9.9 pounds in 1931 and 9.6 pounds in 1930.

At 80°F. the maximum permissible vapor pressure, for the best car, was 17.5 pounds, and, for the worst car, 7.5 pounds. Changes in design of fuel feeding systems are urged.

Flame Movement and Pressure Development in an Engine Cylinder. C. F. MARVIN, JR., and R. D. BEST. *Nat Advisory Comm. for Aeronautics, Report No.* **399** (1931) pp. 3-12.

The rate of flame propagation in the combustion chamber of an engine was observed through windows by a stroboscopic method. The effect of several variables on this rate was studied. In the order of decreasing flame velocity the fuels studied were ethylene, ethane, propylene, propane, and methane.

A Study of Anti-knock Compounds. N. J. BEABER. *Iowa State Coll. Jour. Sci.* **5** (1931) p. 320.

Lead tetra-phenyl in concentrations of 1:5000 to 1:500,000 in gasoline was as effective as an anti-knock as lead tetra-ethyl. Several efforts to make lead tetra-alpha-naphthyl were unsuccessful.

When Is an Automobile Oil to Be Considered as Used Up. CURT EHLERS. *Petrol. Zeits.* **27** (1931) pp. 6-8.

Six oils were used in trucks with 85 H.P. Bussing engines in Hamburg and samples taken every 2000 km. up to 10,000 km. Oils I and 5 were pure Pennsylvania oils. No. 2 was an American asphalt base oil blended with addition of Pennsylvania bright stock. No. 3 was an American asphalt base oil with addition of Western bright stock. No. 4 was a Russian oil. No. 6 was a blend of Pennsylvania and Western oils. The properties of these oils were:

	1	2	3	4	5	6
Sp. gr. at 20°C.	0.884	0.921	0.930	0.906	0.886	0.906
Flash point °C.	239	211	209	231	274	224
Vix. @ 50°C. Engler	13.8	9.1	13.1	12.6	21.5	10.8
Neutralization No.	0.008	0.010	0.032	0.056	0.008	0.018
Tar Number	0.021	0.052	0.210	0.013	0.019	0.070
Tarring No.*	0.046	0.150	0.310	0.044	0.068	0.160
Coking No.*	0.000	0.000	0.120	0.000	0.000	0.010
Oil belongs in Class	I	II	IV	I	I	II

*Determined after passing in oxygen at 170°C. for 5 hours.

The Classes I, II, etc., are defined as follows:

	Tarring No. (Max.)	Coking No. (Max.)
I. First-class oils	0.10	0.00
II. Good oils	0.20	0.01
III. Standard oils	0.25	0.05
IV. Inferior oils	over 0.25	over 0.05

The preliminary rating was confirmed in use. A tar-coke number obtained by adding twice the coke number to the tar number was used as a criterion of the condition of the oil after use. A tar-coke number of 0.90 or higher showed that the oil was used up. Oil No. 3 was used up at 2000km. Oils 2 and 6 were used up at 10,000 km. Oils 1, 4, and 5 were not used up at 10,000 km.

Investigations of Molecular-Physical Properties of Lubricants, and Their Significance in Semifluid Friction. W. BUCHE. *Petrol. Zeitsch.* (1931) p. 587.

Other properties than viscosity are of importance in the region of semi-fluid friction. The author determined the heat of adsorption or wetting and the friction values for a group of vegetable, animal and mineral oils. Taking the heat of wetting pure iron powder with castor oil as 1.0 the heats of wetting of some other oils are: peanut oil 0.83, tar oil 0.54, gas oil 0.43, and three mineral oils 0.83, 0.66, and 0.62. Friction values were determined under conditions such that lubrication was poor, that is with friction values from 0.1 to 0.6 as compared to 0.01 for good lubrication. The author notes that, although such conditions must be avoided in operation, they are had in starting and stopping. At the same viscosity the different oils show very different friction values that correlate with the heats of wetting. The higher the heat of wetting the greater the oiliness, but oiliness is of importance only in the region of semi-fluid friction.

The Question of Oil-Carbon Formation in the Motor. G. BANDTE. *Erdol u. Teer* **8** (1932) p. 10.

Discusses his own and other data and concludes that Conradson carbon is not an index of carbon formation in the engine, that viscosity and flash point are not significant in this connection, that the heaviest oils do not necessarily deposit the most carbon, and that the "carbonization index" is a fair criterion of carbon deposition. This index is the temperature at which, under defined conditions, 90 per cent of the oil is evaporated. The point is made that carbon formation is only one of the many criteria for judging lubricating oils.

Viscosity Fall of Lubricating Oils on Dilution. J. TAUSZ and A. RABL. *Z. Angew. Chem.* **44** (1931) pp. 884-6.

The fall of viscosity of oils on dilution is believed to be the result of breaking of molecular associates. The formulas of Tausz and Staab (Ber. (1931) p. 187) and of Lees (Phil. Mag. 1 (1906), vi, p. 123) are shown to be identical.

Flow of Petroleum Lubricating Greases. M. H. ARVESON. *Ind. Eng. Chem.* **24** (1932) pp. 71-5.

Lubricating greases are applied and used under a wide range of conditions within which the flow characteristics are of first importance. A viscometer has been constructed that satisfactorily measures the flow characteristics of lubricants at predetermined and fixed rates of shear. Data on the characteristics of several worked cup greases and a pulp oil are presented. These cover a wide range of rate of shear (0.08 to 132,000 reciprocal seconds). The apparent viscosity of greases decreases with increasing rates of shear in a manner characteristic of the soap used and approach as a limit a viscosity slightly higher than that of the oil in the grease.

Determination of the Viscosity of Tar, Pitch, and Similar Opaque Substances. D. C. BROOME and A. R. THOMAS *Jour. Soc. Chem. Ind.* **50** (1931) pp. 424 T.—28 T.

Ordinary viscosimeters are not suited to the determination of the viscosity of these substances. The falling sphere method is the most promising, provided that a suitable method is used for observing the fall of the ball in opaque fluids. An apparatus is described in which the steel ball is falling through search coils energized by thermionic valves affects the capacity and inductance of a circuit. By means of suitable amplification the passage of the ball can be detected by a telephone.

The logarithms of temperature and viscosity of true liquids are found to be in linear relationship. However, it is found that tars and bitumens do not always behave as true liquids but exhibit a critical transitional range over which changes of state occur in the materials. Data are given for a refined coke-oven tar, an asphalt-base flux oil, a residual bitumen and another tar.

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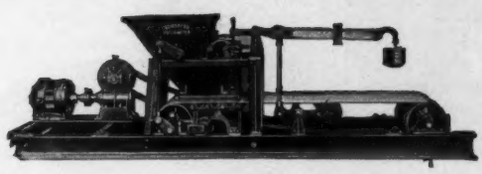

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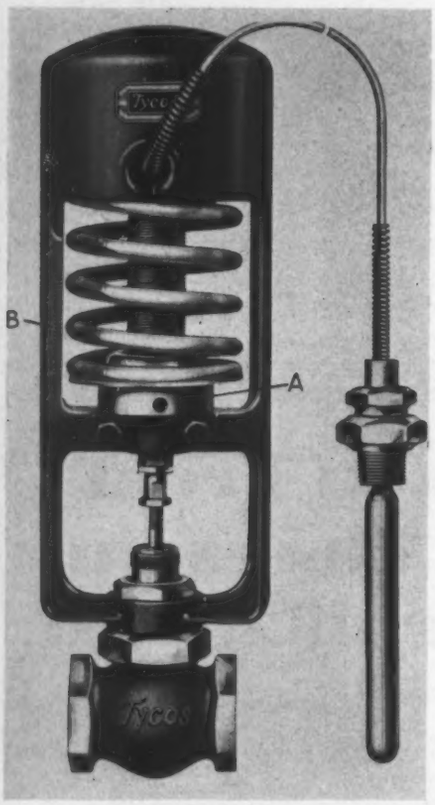
New Equipment for the Modern Plant

1. Self-Acting Temperature Regulator

TAYLOR INSTRUMENT COMPANIES

Taylor Instrument Companies, Rochester, New York, through radical changes to remove faulty features, has developed the Tycos self-acting temperature regulator, which it is now marketing to the refining industry. The most important improvement named by the manufacturers is the practical elimination of friction, which formerly hindered the performance in self-acting regulators of the direct bellows and stem-connected type. Friction seriously interfered with the operation of most self-acting regulators, manifesting itself by the inability of the valve stem to assume the same position for the same bulb temperature, while it was necessary that the bulb temperature must be changed several degrees before the valve stem starts to move.



Tycos Temperature Regulator

Another element which contributes greatly to the superior performance of the Tycos regulator and its adaptability to the greatest variety of applications is the construction of the tube system. This consists of a double seamless bellows, extra heavy walled copper connection tubing and stainless steel bulb of exceptionally small size and thin wall.

This tube system requires a minimum volume of actuating medium, which makes a small bulb possible and together with the thin wall of the bulb and its shape results in a tube system that responds quickly to temperature changes. Of great value also is the overheating features of the tube system which permits heating the bulb beyond the upper limit of the range of the instrument without damage.

The improved Tycos self-acting regulator is applicable to use in crude oil treating plants, hot water tanks, natural gasoline plants and fuel storage tanks.

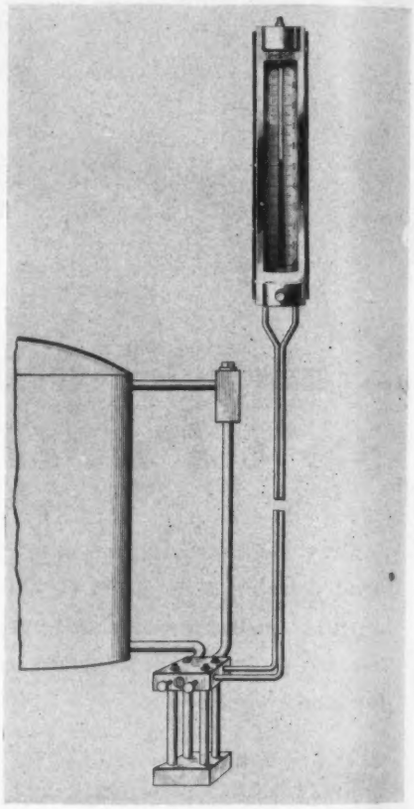
2. Liquid Level Gage

T. W. McNEILL ENGINEERING EQUIPMENT COMPANY

T. W. McNeill Engineering Equipment Company, 4057 West Van Buren Street, Chicago, is now marketing the McNeill improved liquid level gage for indicating varying levels of liquid at remote distances, whether above or below the actual level.

This instrument is entirely hydrostatic in its actions. While particularly adaptable for the measurement of varying levels of oil in storage tanks, it finds other applications in the oil industry, where extreme temperature and pressure variations are factors to be considered, as neither of these will affect the normal functioning of the gage.

Mercury is the measuring medium, two mercury U tubes being used in this gage, connected in series with each other and with the indicating element. The mercury tubes are set in metal blocks, into which



McNeill Liquid Level Gage

are bored connecting passages. Two needle valves are a part of the upper block of the mercury element, that open to a common passage by means of which the filling fluid (usually kerosene) may be injected.

The length of the mercury tubes depends on the distance above them to the desired position of the indicator, as well as the weight and total variation of level of the liquid to be indicated.

3. Non-Recording Flow Controller

NEILAN COMPANY, LTD.

Neilan Company, Ltd., Los Angeles, announces a new non-recording flow controller. This instrument is said by the manufacturers to be the first flow control

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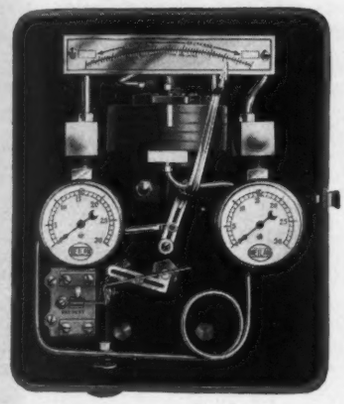
instrument available of the non-recording variety.

The construction is extremely simple. Only a slight amount of force is required to operate the fully balanced Neilan compound pilot valve. This force is supplied by the differential acting through stainless steel mercury pots. Like other Neilan controllers, this device is also equipped with the exclusive safety elbow which protects the instrument in the event that the differential exceeds the range of the instrument.



Neilan Flow Controller

This device is so made that it is easily converted from one differential range to another. Furthermore it can be easily set from the outside of the case by simply turning a knurled thumb nut.

The instrument operates any size diaphragm control valves from one-eighth-inch in size on up. Working parts are machined of Nirosta KA2 stainless steel. The operating mechanism is enclosed in a light, strong Duralumin case.

4. Stainless Steel

ASSOCIATED ALLOY STEEL CO.

Associated Alloy Steel Company, Cleveland, following eight years of research, experimentation and development on the part of Ludlum Steel Company, announces a new patented stainless steel alloy known as Nevastain RA, which offers a number of economic and fabricating advantages.

The company states that the one object which was the basis of all of the research was to develop a stainless steel which could be mill processed and handled by the fabricator with the same tools and heat treatment general for mild steel.

It is explained that in the various manufacturing operations, Nevastain RA can be deformed hot without causing undue strains on rolls, forging presses, hammers, heading and up-setting machines. The manufacturers state that full ductility is obtained at normal annealing temperatures. The new Nevastain RA is described as free machining and may be sheared, punched, perforated, sawed and drilled by ordinary methods.

5. High Capacity Steam Trap

ARMSTRONG MACHINE WORKS

Armstrong Machine Works, Three Rivers, Michigan, name high capacity and simplicity as the feature points of the free floating lever steam traps recently developed. This new trap uses the inverted bucket principle, originally developed by Armstrong, a principle providing for non-air-binding, self- scrubbing.

The valve lever loops over two guide posts at one end and engages the bucket hook at the other, as illustrated here. When the bucket floats it pushes directly against the valve stem, forcing the valve to its seat.

Steam pressure within the trap holds the valve against the seat. Water entering the inverted submerged bucket causes the bucket to lose its buoyancy and exert a pull on the end of the lever. The valve is opened as soon as the weight of the bucket multiplied by the high leverage is greater than the pressure holding the valve against the seat. When opening, the valve lever fulcrums on the knife edges which bear directly on the valve seat.

Using a high leverage for opening the valve and a direct 1 to 1 lift for closing prevents excessive wear on the

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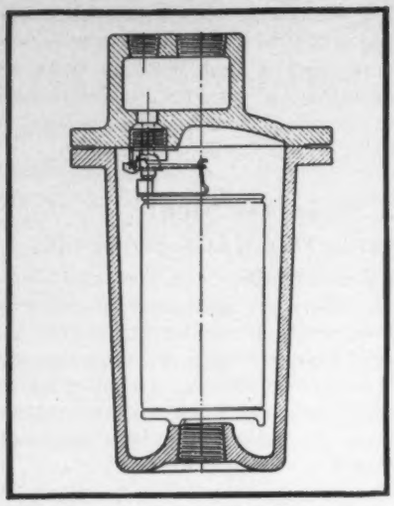


Illustrating Armstrong Steam Trap

operating mechanism. There is very little strain on the operating mechanism when the valve opens, the bucket increases its pull on the lever until the valve opens. On the contrary, in closing the speed of the bucket is at a maximum just as the valve reaches its seat. With the free floating lever construction, the 1 to 1 closing leverage causes far less wear than if fixed pivots and consequent high leverage were used to stop the upward motion of the bucket.

Substituting knife edges for the conventional pivots largely eliminates friction and also makes it possible to open larger diameter orifices at a given pressure. These traps have heat treated chrome steel valve parts.

The new Armstrong Traps are furnished in cast semi-steel for pressures up to 250 pounds. In the forged steel pattern, the traps are available for 600, 900 and 1500 pounds pressure service with any degree of superheat.

6. Vacuum Refrigeration

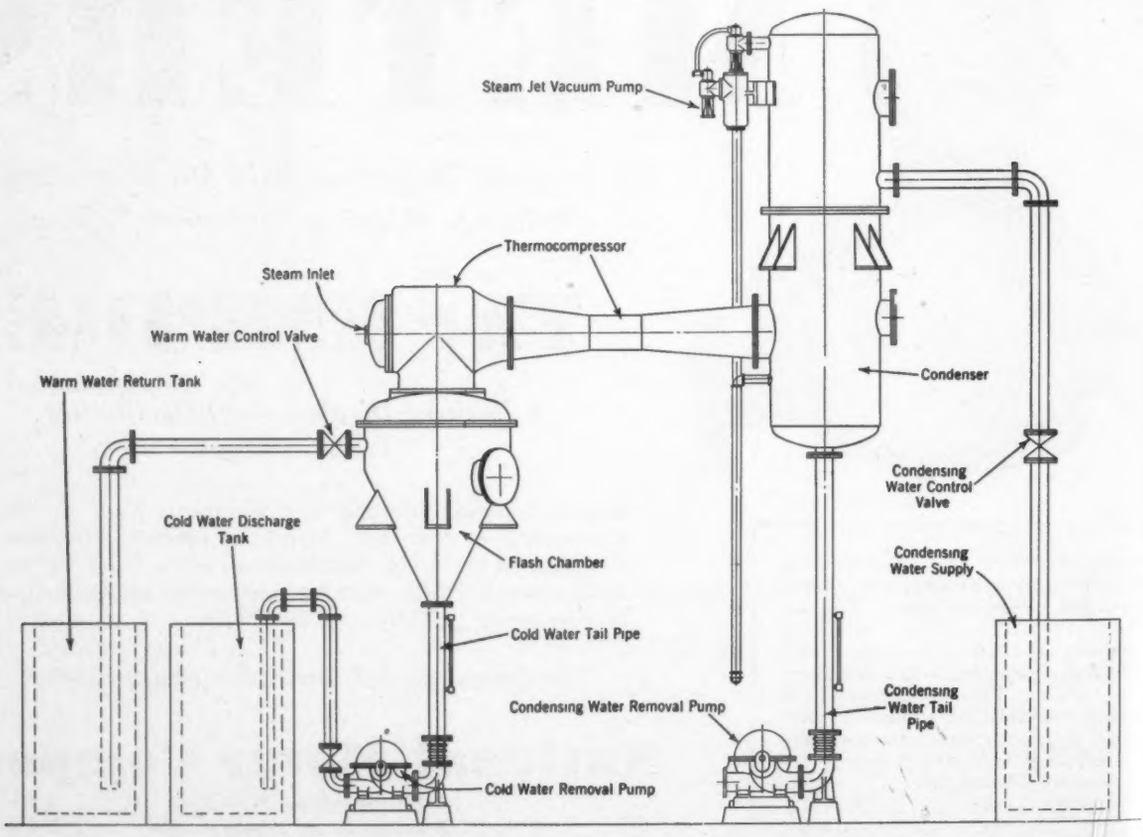
FOSTER WHEELER CORPORATION

Foster Wheeler Corporation, 165 Broadway, New York City, has developed a vacuum refrigeration system for maintaining water at low temperatures (32 to 50° F.) which can be installed wherever there is a supply of steam for operating the equipment. The operating principle of the system is "flash evaporation" and details of assembly are shown in the accompanying flow chart. The system has numerous applications in general industrial practice wherever a continuous supply of cooling water is essential to the process operation. In the oil refinery it may be employed for the pre-cooling of paraffin distillates and wax prior to actual refrigeration necessary for the recovery of wax. As a pre-cooler the device will reduce appreciably the load on the main refrigeration equipment with a consequent increase in economy. It is also applicable for condensing and cooling the extremely light ends in gasoline vapor recovery systems.

7. Gelowax

GLYCO PRODUCTS COMPANY, INC.

Glyco Products Company, Inc., has introduced a novel wax which differs from other waxes in that there is a wide spread between its softening and melting points. For example one grade has a softening point of 60° C. and a melting point of 88° C. When melted this wax is gelatinous in nature and because of this high viscosity when molten does not run or drip as readily as other waxes. Chemically it is a treated straight chain hydrocarbon which does not saponify or emulsify. It is of a light yellow to white color and



Typical Foster Wheeler Vacuum Refrigeration System

more soluble in hydrocarbons and chlorinated solvents than other waxes. In spite of its high melting point, it is plastic and has a good tensile strength. Gelowax, because of its interesting properties and low price, is, of interest in candles, polishes, insulations, crayons, cosmetics, lubricants, waterproofing, etc. It is being marketed by Glyco Products Company, Inc., Bush Terminal, Brooklyn, N. Y.

Concern with established connections in oil and allied industries in Eastern territory wants agency for pressure vessels, alloy tubing and similar equipment to fit in with present line. Box 154, care Refiner & Natural Gasoline Manufacturer, Houston, Texas.

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8. Recording Pressure Gauge

THE BRISTOL COMPANY

The Bristol Company, Waterbury, Connecticut, announces a new direct reading, single pen, absolute pressure gauge of the recording type which eliminates possibility of confusion or delay. It can be furnished for ranges as low as from 0 to 50 millimeters head of mercury pressure absolute, or equivalent.

Such an instrument gives important information for purposes of control in connection with operation of turbo-condensers, vacuum oil stills, vacuum retorts in chemical plants, the manufacture of gaseous type vacuum tubes, and similar devices.

The actuating mechanism consists of two extremely sensitive diaphragm elements. One is connected to the vacuum line, and the other is directly affected by barometric pressure variations. The resulting movements of these elements are transmitted by a differential transmitting linkage to a single penarm which permanently records on a suitable chart.

The case for housing the instrument is all metal, attractive in design and of rugged construction. It is available for surface or flush mounting.

9. Vent Valve and Flame Arrestor

VAPOR RECOVERY SYSTEMS CO.

The Vapor Recovery Systems Company, Compton, California, announces an aluminum conservation vent valve and an aluminum entrainment separator flame arrester.

Heavy cast aluminum ends direct the flow of gas in streamline fashion so as to distribute the flow over the complete area of the bank. The arrester bank itself is of the cartridge type and consists of sheets which are corrugated both vertically and horizontally to effect a bumping of the gasoline laden tank vapors in passing through. Gasoline disseminated throughout tank vapors is in the form of actual molecules of liquid, which are separated by this article and are drained back into the tank.

According to the manufacturer, the flame arrester has been approved by the Underwriters Laboratories.

10. Pumping Unit

ALLIS-CHALMERS MANUFACTURING COMPANY

Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, has recently introduced a compact pumping unit, Type SSU pump, to serve a varied number of jobs in fluid handling. The pump and motor are built as a single unit to eliminate possibility of misalignment and to

CLEAN YOUR OIL

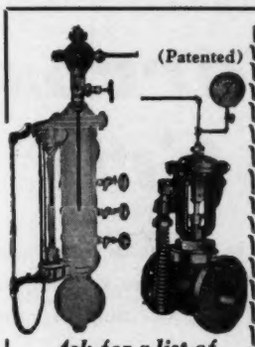
before barrelling or packaging. Remove the pipe line and tank accumulations, moisture and dirt by passing the finished oil through

SHRIVER Blotter Presses

They provide a most economical and efficient means for accomplishing this work not only for oils but gasolines as well. Contacted oils when passed through Shriver Blotter Presses, are given a sparkling, bright animated appearance.

Your inquiries are solicited.

T. SHRIVER & CO.
Est. 1860
848 HAMILTON STREET
HARRISON, N. J.
Filter Presses
Filter Cloth ***Diaphragm Pumps***



(Patented)

Ask for a list of leading refiners who are using the

Campbell Boiler Feed Regulator

Refiners prefer the Campbell because of its absolute dependability and simplicity. Nothing to get out of order. No moving parts in the regulating element. No floats, links, generators, or thermostats. It offers the utmost in efficiency and economy. Use the coupon at the right for data on Atlas regulating devices for ANY service.

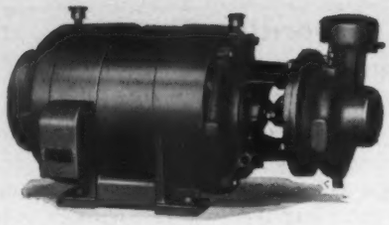
ATLAS VALVE CO.
275 South Street, Newark, N. J.

ATLAS VALVE CO., 275 South St., Newark, N. J.
Without the slightest obligation, please send information, including prices, on the following Atlas products:—
☐ Campbell Boiler Feed Water Regulator ☐ Pump Governors ☐ Float Valves ☐ Swing Joint Fittings ☐ Thermostats ☐ Reducing Valves ☐ Balanced Valves ☐ Damper Regulators ☐ Control Valves ☐ Temperature Regulators

Name.....
Firm.....
Street.....
City.....
State.....

make installation simply an installation job. The unit is small, light in weight, and is easily transported. Any rigid support is sufficient for a foundation.

It is announced as suitable for pumping either water or oil, as at loading racks, treating plants, cooling towers, for circulating water, pickup pumps, for oil transfer or water supply, or virtually any pumping job where the capacity is from 30 to 300 gallons per minute, with a maximum head from 90 to 110 feet. Forty to 400 barrels per hour with 40 to 45 pounds pressure. It is furnished in either 1750 r.p.m. or 3500 r.p.m units.



Allis-Chalmers Type SSU Pump

Motor leads are arranged so that they can be interchanged for either 220 or 440 volt. Either standard open type or totally enclosed type or totally enclosed fan-cooled motors can be furnished. For special applications where explosive gases are present, special explosion proof motors are available.

When used for handling untreated oil from storage, some sort of simple strainer for the suction line is recommended to prevent trash and foreign particles from being sucked up into the impeller openings.

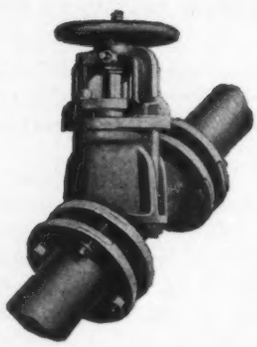
There are only two bearings, both of which are totally enclosed and grease packed. There is one continuous heavy shaft for both the pump runner and motor rotor.

MASTERS
of Corrosion and Grit

Let your search for savings in plant operation extend itself to valves. Where valves are subject to the abuse of corrosives and grit, you may be paying too much for replacements.

If such is the case, then it is time to get valves that have proved to be masters of corrosion and grit. Duriron Valves stand up under the attacks of both indefinitely, saving you all the cost and delay of valve failure.

Duriron Valves are stocked in a variety of types and sizes, including Y Valves, Plunger Release Plug Valves, Lubricated Plug Valves, Check Valves and others. Write for details.



Corrosion and erosion-resistant Duriron Y Valves have full opening and nearly straight flow. Free from sticking and scoring. Widely in demand for acid service.

Above at the left—Duriron-Nordstrom Lubricated Plug Valve. Combines acid and grit-resisting properties with well-known internal lubricating features.

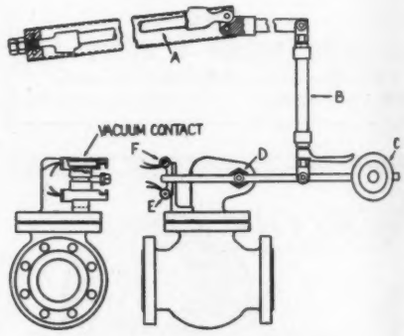
THE DURIRON COMPANY, INC.
412 N. Findlay St. Dayton, Ohio

DURIRON

11. Valve Signal Device

NORTHERN EQUIPMENT COMPANY

Northern Equipment Company, Erie, Pennsylvania, announces a new electric signal device for use with the control valve on the Copes Feed Water Regulator. It gives warning of any abnormal condition in the boiler feed supply by signalling by means of a bell or an electric light if the valve should reach the wide-open or fully-closed positions.



Northern Signal Device

The application of this new unit is shown by the illustration here. When expansion tube "A" of the Copes thermostat contracts with rising water level, the motion is transferred through the vertical strut connection and tension relief "B" to raise the weighted lever "C," gradually closing the valve. This lever pivots at the stuffing box "D" and the extended end moves downward. Should some abnormal condition cause the valve to reach a fully-closed position, the lever striking vacuum contact "E" closes the circuit for the "closed" signal.

As water level in the expansion tube lowers, the tube expands, permitting the weighted lever to open the valve gradually. Should the fully-open position be reached, the extended end of the lever strikes vacuum contact "F" and closes the circuit for the "open" signal.

The vacuum contacts are fully protected in a metallic case which is adjustable to any desired position. The signal may be installed on any Copes control valve.

ITEMS ABOUT MANUFACTURERS

The Louis Allis Company, Milwaukee, announces appointment of Sterling Electric Motors, Inc., as sales representatives on the Pacific Coast. The new distributor will handle Louis Allis "explosion proof motors" and standard squirrel cage motors built in sizes up to 250 h.p., and also Louis Allis direct current motors, frequency converters, inverted rotary converters and other types of motors which will supplement the Sterling line and enable them to offer motors of practically all types and sizes required for industrial purposes. Louis Allis motors are now available from stocks located in both Los Angeles and San Francisco.

The Neilan Company, Ltd., (Division of Mason Company) and Mason Regulator Company announces the establishment of joint office at 409 East Archer Street, Tulsa, with Gordon Thomason in charge. Thomason is an experienced control engineer. The office will handle the sale of both Neilan and Mason instruments and regulators for the control of pressure, temperature and flow.

The firm of Hermann Frischer Chemisch-Technisches Buero, Berlin, Germany, has, after 20 years of operation all over Europe, established a branch office under the name of H. H. Frischer & Company, 24 Monroe Place, Brooklyn, N. Y., as consulting engineers for the heavy chemical industry. Dr. K. F. Sonnenstuhl is the resident manager of the office.

E. I. du Pont de Nemours & Company is preparing to spend $350,000 in a modern plant in connection with its paint and varnish factory at Philadelphia. Plans for this addition, in the form of a three-floor and basement building approximately 155 x 68 feet, are to turn out Dulux, a recently developed finish which is used extensively in the oil industry.

Alco Products, Incorporated, on March 1, acquired the business, good will, patents and essential personnel of Jackson Engineering Corporation of Tulsa, Oklahoma. This brings a new combination of technical experience and industrial resources into the field of engineering, designing and constructing gasoline plants and equipment for the oil refining industry.

Alco Products is a division of American Locomotive Company, with headquarters in New York City, with large plants at Dunkirk, New York and Montreal, Canada, and branch offices in principal cities of the country. It has been engaged for more than a year in the design and manufacture of process plants and equipment for oil refineries and completed many of the most important units erected in 1931.

Jackson Engineering Corporation has been a leading factor in the engineering and design of gasoline plants and equipment, and has engineered some of the largest plants of this kind ever erected. These included in 1931, Atlantic Refining Company's gasoline recovery and stabilizing plant at Point Breeze, Philadelphia, and the gasoline recovery plant at head of Continental Construction Company's Panhandle line from Texas to Chicago. This plant is designed to treat 220,000,000 cubic feet per 24 hours of gas at 600 pounds pressure.

GORDON M. JACKSON

Practically all of the key men of Jackson Engineering Corporation have been retained. Gordon M. Jackson, former president has become sales manager. The technical men are now in charge of design and engineering in the gasoline plant division of Alco Products. They are continuing under the direction of Karl Finsterbusch, former chief process engineer of Jackson Engineering Corporation, with Paul D. Barton as consulting engineer. The former field engineers will continue in their former locations, with A. B. Burket in Tulsa; E. J. Hudson in Dallas; M. H. Roths in Chicago and N. M. Floyd in New York.

Other former Jackson Engineering Corporation engineers now part of the Alco Products staff are: H. S. Houghton, A. T. Krook, D. B. Banks, W. G. Miller, A. W. Pratt, T. E. Casselman, H. C. Trick and F. M. Gibbons.

Kennedy Valve Manufacturing Company announces removal of its Chicago branch office and warehouse to larger quarters at 1306-1312 South Canal Street. The new office is located in the Soo Terminal, providing convenience for prompt deliveries throughout the territory served by this office.

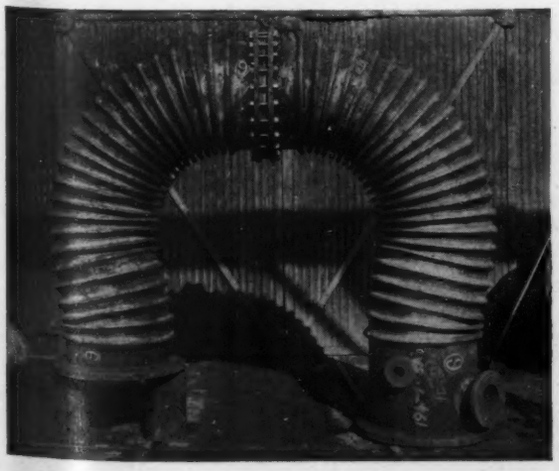
Pittsburgh Valve and Fittings Company, Barberton, Ohio, has appointed Clyde Goza of Houston representative for Oklahoma, Arkansas, Louisiana and part of Texas.

Lukenweld, Inc., Coatesville, Pennsylvania, announces the appointment of William S. Wilbraham as assistant manager of sales, to work directly with Henry H. Peck, sales manager. Wilbraham has been in charge of the estimating and order departments of the company since its establishment in 1929 to manufacture welded parts for machinery and equipment.

The Babcock & Wilcox Tube Company, Beaver Falls, Pennsylvania, announces the opening of a new branch office, in the Ford Building, Detroit, Michigan. J. E. Polhemus has been appointed district sales manager, in charge of the Detroit territory. He was formerly assistant vice president and district sales manager of the Detroit sales branch of Associated Alloy Steel Company of Cleveland.

O. C. Keckley Company, 565 Washington Boulevard, Chicago, has recently appointed the Brance-Krachy Company, Inc., of Houston as Gulf Coast representatives for Keckley oil country products. Brance-Krachy Company, Inc., is located at 910 St. Charles Street, Houston, and maintains a warehouse in connection with its office.

Worthington Pump & Machinery Corporation announces the sudden death of John T. Clancy, one of its executives, March 9, of heart attack while he was lecturing at the Engineers' Club, New York City, before a meeting of the American Society of Mechanical Engineers. He had been with Worthington since 1919, and in 1923 became assistant manager of oil and gas engine sales at the Buffalo plant. In July, 1931, his headquarters were moved to the Harrison, New Jersey, plant.



"PARTICULAR PIPING"

CORRUGATED PIPE BENDS

"Aiton Process"

Power Plant Piping
Process Piping
} ANY PRESSURE, ANY TEMPERATURE

MATERIALS ONLY OR
SYSTEMS INSTALLED

STANDARD PIPING & FITTING CO.

Sole Licensee for "Aiton Process" in U. S. A.

49TH & GRAY'S AVENUE ◆ PHILADELPHIA, PENNA.

CATALOGS . . . BULLETINS

Helpful Publications Which Manufacturers Will Be Glad to Send Free for the Asking

Process Equipment

Edge Moor Iron Company's Alloy Equipment Department, Edge Moor, Delaware, announces Bulletin No. 71, which describes and shows special equipment for the process industries.

Flexible Couplings

Poole Engineering & Machine Company, Baltimore, Maryland, has recently published a 44-page pictorial book, titled Flexible Couplings, covering the Poole flexible coupling, how it works, etc.

Asbestos Filters

Alsop Engineering Corporation, 39 West 60th Street, New York City, announces an addition to its catalog of several pages describing the new Hy-Speed asbestos disc filters. Several of the many available models are shown, and considerable space is given to the asbestos discs used in these filters. A copy of the catalog may be had for the asking.

Piping and Valves

Sement-Solvay Company, 40 Rector Street, New York City, tells the story of Sement-Solvay piping and valves in Bulletin No. 44, 48-page illustrated bulletin, a copy of which is available upon request.

Fire Brick

E. J. Lavino and Company, Bullitt Building, Philadelphia, has issued Bufletin No. 1-13-17, a leaflet presenting standard shapes in improved Lavine Chrome brick. The leaflet is punched for folder filing.

Belt Conveyors

Diamond Rubber Company, Inc., Akron, Ohio, gives an elaborate pictorial layout of plant problems from the standpoint of conveyors, in which is shown the work of this company's Diamond belt conveyor, its adaptability to various jobs.

Roller Bearings

Shafer Bearing Corporation, 621 South Kolmar Avenue, Chicago, offers Bulletin No. 501 upon request to individuals or organizations interested in the company's line of radial-thrust roller bearings. This bulletin lists all Shafer single and double row bearings, including many new sizes which have been added. All bearings are listed by bores, with complete dimensions and tolerance. Load ratings, list prices and code words are included; also speed factor chart.

Cast Iron Pipe

American Cast Iron Pipe Company, Birmingham, Alabama, announces publication of a 48-page booklet, carrying specifications for ACIPCO mono-cast centrifugal pipe, bell and spigot, and fully illustrating the information with actual working scenes.

Stainless Steel

Associated Alloy Steel Company, Inc., Union Trust Building, Cleveland, has a 24-page booklet recently off the press which tells the story of Nevastain Superalloy. Illustrations throughout the booklet show many of the varied uses of this product in finished articles.

Cast Iron Pipe—Fittings

The Central Foundry Company, Graybar Building, New York City, announces publication of a six-page color folder featuring the Universal Dual-Lok joint, cast iron pipe and fittings, designed for double safety against leakage. Complete information from the standpoint of design and construction is carried, and actual working photographs are shown throughout.

Rotary Pumps

Northern Pump Company, Minneapolis, Minnesota, has issued a four-page folder devoted to Northern rotary pumps, "NH Series" Cycloid type, ranging in capacities of 50 G.P.M to 700 G.P.M. and pressures up to 500 pounds. The folder is well illustrated, including a blue print cross section, and a table of dimensions in inches.

Scrubber

Hardinge Company, Ins., York, Pennsylvinia, describes and illustrates the Hardinge conical scrubber for cleaning aggregate in a bulletin recently off the press and available to interested parties.

Portable Furnace

Denver Fire Clay Company, 1742 Champa Street, Denver, Colorado, will furnish upon request a copy of Bulletin No. 460, covering in pictures and story the P.C.E. Furnace, American Refractories Institute type of portable furance.

Engine Indicators

Bacharach Industries Instrument Company, 7000 Bennett Street, Homewood Station, Pittsburgh, announces a new piece of literature covering recent developments in its line of Maihak engine indicators. This is Bulletin No. 3266, a copy of which is available for the asking.

Gages

The Hays Corporation, Michigan City, Indiana, has recently published a new catalog, No. PGA-32, covering in pictures and detailed description the corporation's complete line of pointer gages for draft, pressure and differentials. This catalog describes the operating mechanism of all three types, "V," "F," and "J," and an operation consisting essentially of a slack leather diaphragm and a phosphor bronze cantilever spring attached to a pointer which is mounted on a pivot bearing. The diaphragm is described as a pliable, tough, gas-tight membrane, and transmits the force of the draft or the pressure to the flat bronze spring which in turn moves the counterweighted pointer, producing a reading on the scale in a direct proportion to the magnitude of the force.

Indicator Recorder

C. J. Tagliabue Manufacturing Company, Park and Nostrand Avenues, Brooklyn, New York, has issued Catalog No. 1025, which fully describes and illustrates the new Tag-Mono indicator-recorder, a new all metal automatic flue gas analyzer.

Refractory Cement

E. J. Lavino & Company's refractories division, Bullitt Building, Philadelphia, has issued Bulletin 1-21-1, titled "Wetkrome," which regards the product of that name, a wet, ready-mixed, ready to use chrome ore cement. The little bulletin tells what Wetkrome is, how it is made and gives details of its uses to hold and preserve bricks, regardless of temperature.

Cooling Towers

Marley Company, 1737 Walnut Street, Kansas City, tells the story of Marley forced draft spray cooling towers in an eight-page bulletin, recently off the press. The bulletin is profusely illustrated to show in complete form every angle of this new cooling phase.

Vacuum Refrigeration

Foster Wheeler Corporation has published a new pamphlet entitled, "Vacuum Refrigeration System," number of bulletin W. J.-31-3. The pamphlet describes a new method of refrigeration by evaporating, under high vacuum, a portion of the water or brine to be cooled. Cooling is direct, requiring no intermediate refrigerant or cooling coils. Since the water or brine is its own refrigerant there are no noxious, poisonous or expensive fluids in the system. Since the system operates under vacuum it uses no pressure vessels. No moving parts are included in the installation except for the rotors of two centrifugal pumps, one of which is the circulating pump for the barometric condenser and the other the removal pump for the vacuum chamber. The source of refrigeration is a steam operated thermo compressor which can be installed wherever steam is available at a pressure of 15 or more pounds per square inch.

Cast Iron Pipe

American Cast Iron Pipe Company, Birmingham, Alabama, presents an illustrated discussion of the Modified Fairchild Formula for determining metal thicknesses for cast iron pipe as a feature of a new booklet, "Specifications for

COMPANY . . . . . .

ADDRESS . . . . . .

Please send to me, without obligation, free booklet described in the April issue of REFINER AND NATURAL GASOLINE MANUFACTURER.

NAME . . . . . .

ADDRESS . . . . . .

Acipco Mono-Cast Centrifugal Cast Iron Pipe, Bell & Spigot, 1932." The new booklet is occasioned by the recently promulgated federal specifications for bell-and-spigot cast iron pipe in which certain revisions of former requirements are contained.

Alloy Pumps and Fittings

Alloy Pump & Valve Company, 6007 Euclid Avenue, Cleveland, Ohio, has published a four-page color folder in which a brief, illustrated story of Alloy pumps, Alloy valves, alloy fittings and Alloy castings is told. The various ranges of each of these four lines of alloy products are listed under the respective products for the reader's convenience.

Refractories

General Refractories Company, 106 South Sixteenth Street, Philadelphia, has recently reprinted, in booklet form a story "New Developments in Unburned Magnesite Brick for the Metallurgical Industry," by A. E. Fitzgerald, ceramic engineer, General Refractories Company. The booklet covers 12 pages, including a pictorial story of the company's 20 modern plants providing a complete refractory service.

Acid Pump

Oliver United Filters, Inc., 33 West 42nd Street, New York City, has issued a two-color folder featuring the new developments in the acid pump construction. The pump is now made in a modified design, providing for circulating solution on the packing gland in place of grease, if grease is not desired. The shaft of the pump is now anchored to the impeller by a longitudinal tie-rod extending through its axis. The sleeve on the shaft is attached to it more substantially than before. The roller bearings on the shaft are provided with ample oil-chamber lubrication, and the arrangement for adjustment of packing glands are further simplified for the convenience of the operator. The folder is well illustrated, and the new features of the pumps are briefly explained.

Motors

Wagner Electric Company, 6400 Plymouth Avenue, St. Louis, has issued a 22-page bulletin on squirrel-cage motors, Bulletin 174. This bulletin describes the seven types of squirrel-cage motors, gives application tables, speed-torque curves, and complete construction details. It is in loose-leaf form to permit keeping it up to date at all times. The bulletin is profusely illustrated with reproductions of actual views of these motors in use. The pointer system of descriptive underlines for illustrations is used to facilitate the study of the motors and their parts. Information on each of the seven types of motors described is segregated to the point of each motor description being a separate section.

Engines

Cooper-Bessemer Corporation, Mt. Vernon, Ohio, has published a four-page bulletin entitled "Cooper-Bessemer Engines for Direct-Driving Hot Oil Pumps" describes the company modern development which is of particular interest to refiners. In pointing out the economy of utilizing refinery gas for this type of power, the bulletin lists the comparative fuel consumption per brake-horsepower hour of a four-cycle gas engine versus four distinct types of steam prime movers. There sketches are carried on the back page of the bulletin showing arrangements and space plans for single and twin-tandem horizontal-gas-engine drive for hot oil pumps. It is stated that vertical-gas-engine drive may also be employed.

Important Announcement to Oil and Gas Industry

The J. A. Campbell Company is now manufacturing and distributing the

Daniel Orifice Fitting

Decided improvements have been made in this outstanding piece of equipment during the past year. This fitting has been previewed by over a hundred gas measurement engineers and has been proclaimed a triumph in engineering development.

Plate can be changed and inspected in from one to three minutes and with perfect safety regardless of line pressure.

One speed-wrench performs all operations.

Plate operating mechanism is so powerful that a thousand-pound pull is easily exerted by a turn of the speed-wrench. Fittings are built of the best material obtainable and designed with high factor of safety not alone for pressure, but for line strain.

Heaviest piece of top assembly on a 24" fitting for a safe working pressure of 500 lbs. is 14 lbs.

Ask for Literature

J. A. CAMPBELL CO.

NATURAL GAS ENGINEERS

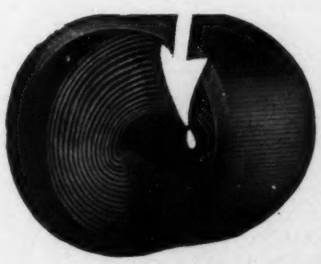
Consulting — Designing — Constructing

P. O. BOX 669 Long Beach, Calif. PHONE 416-93

Manufacturers of Gasoline Plants

"Oil-Froth" Absorbers — Mist-D-Fiers — Volz Regulators

The Spiral Motion Is the Trick



That's why Hood's Chemico Spiral Packing Rings have been selected by so many engineers. The center hole prevents choking and clogging.

Made of acid-resisting shale—practically indestructible.

Used by all big producers because of the intensive movements.

Samples on request

B. MIFFLIN HOOD CO., DAISY, TENN.

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THE MONTH IN REVIEW

Natural Gasoline Association Program

THE economic status of natural gasoline will have thorough consideration during the annual meeting of the Natural Gasoline Association of America at the Mayo hotel, Tulsa, May 17, 18 and 19. One session will be devoted to this economic discussion, while other sessions will be devoted to engineering and operating problems.

R. C. Alden of Phillips Petroleum Company, will present the economic program, which will have ample discussion. His paper will be printed in advance of the meeting so members may study his findings and recommendations in order to be prepared to take part in the discussion.

The program was prepared by a committee of which A. T. Scherer of Sinclair Oil & Gas Company is chairman. Other members are R. E. Baker, Shell Petroleum Corporation, Walter Moran, Crosbie & Moran, Inc., E. L. Stauffacher, Empire Oil & Refining Company, O. C. Field, Field Gasoline Corporation, and G. M. Campbell, United Gas Public Service Company.

A subject new to the natural gasoline industry will be presented by H. Ross Campbell of Crosbie & Moran, Inc., on carbon dioxide. This concern entered the business of manufacturing carbon dioxide from natural gas last year and has a plant operating at Tulsa.

Entertainment

Entertainment will be provided by the Natural Gasoline Supply Men's Association. A luncheon the first day, a stag smoker the evening of the second day and a luncheon the second day will make up the entertainment. The annual meeting of the organization of supply men will be held the morning of the first day of the convention.

Officials of the Natural Gasoline Association of America are S. S. Smith, Shell Petroleum Corporation, president; Emby Kaye, Skelly Oil Company, W. W. Robinson, The Texas Company; G. M. Campbell, United Public Service Corporation, vice presidents; and Ray E. Miller, secretary.

Officials of the Natural Gasoline Supply Men's Association are A. W. Burket, Alco Products, Inc., president; W. D. Moorer, Moorlane Company, first vice president; A. B. V. Candler, National Supply Company, second vice president; E. H. Triphaus, Taylor Instrument Company, treasurer.

Following is the tentative program:

Tuesday, May 17

12:00 o'clock noon—Luncheon, furnished by Natural Gasoline Supply Men's Association.

SIDNEY S. SMITH

A. W. BURKETT

Afternoon Session—1:30 o'clock

Address of Welcome—Frank L. Chase, Lone Star Gasoline Company.

President's Address—S. S. Smith, Shell Petroleum Corporation.

Reports of Active Standing Committees.

Paper: "Properties of Hydrocarbons at High Pressures as Applied to the Design of Absorbers, Strippers and Stabilizers—Dr. G. G. Brown, University of Michigan.

Paper: "Refinery Vapor Recovery Systems, Including the Physical Properties and Utilization of Products"—Author to be selected.

8:00 P.M.—Stag Smoker furnished by Natural Gasoline Supply Men's Association.

Wednesday, May 18

Morning Session—9:30 o'clock

Broad Discussion of Economics of Natural Gasoline Industry—R. C. Alden, Phillips Petroleum Company. (It is planned to preprint Mr. Alden's paper and distribute it in advance at the registration desk. In this session Mr. Alden will briefly outline his paper in sections and lead the discussion on those sections).

Afternoon Session—2:00 o'clock

Paper: "Natural Gasoline Markets and the New Grading System"—J. A. LaFortune, Warren Petroleum Company.

Paper: "The East Texas Field"—G. H. L. Kent, Humble Oil & Refining Company.

Paper: "Pipe Line Transportation of Natural Gasoline"—O. C. Field, O. C. Field Gasoline Corporation.

9:00 P.M.—Dance furnished by Natural Gasoline Supply men's Association.

Thursday, May 19—Morning Session—9:30 o'Clock

Paper: "Operating Economies Effected During 1931"—Fred Shryock, Shell Petroleum Corporation.

Paper: "Specifications, Stenches and Markets for Liquefied Petroleum Gases"—G. G. Oberfell or T. W. Legatski, Phillips Petroleum Company.

Paper: "Carbon Dioxide"—H. Ross Campbell, Crosbie & Moran, Inc.

Paper: "Blending Natural Gasoline with Refinery Products"—J. L. Gallagher, Sinclair Oil & Gas Company.

12:00 o'clock noon—Luncheon, furnished by Natural Gasoline Supply Men's Association.

Royalty Rates Again Reduced

FOR the second time within three months, Universal Oil Products Company has come to the aid of refiners by making special royalty rates on certain stocks to meet specific problems which the refiners face. The company announced, effective April 1, reduction in royalty rate for viscosity breaking by the Dubbs cracking process.

At the same time, the company announced that there is no royalty to be charged for straight-run gasoline content of the crude oil run to the cracking unit, provided the straight-run gasoline is not subjected to cracking conditions.

On February 1, Universal made available to licensees a special royalty rate of five cents a barrel to cover cracking

or reforming of straight-run gasoline and naphtha boiling up to 400° F.

The new rate for viscosity breaking will apply mainly to heavy viscous oils, whether crude oil or topped crude, where maximum yield of gasoline is not the primary purpose but where the chief end aimed at is reduction of viscosity to meet fuel oil specifications.

The royalty schedule covering viscosity-breaking is as follows:

A flat rate of five cents per barrel of charging stock for yields of 400 end-point raw gasoline up to 10 per cent by volume of the charging stock.

For each additional one per cent above 10 per cent of yield an additional royalty of one-half cent per barrel of charging stock will be charged.

Thus, the regular existent royalty rate of 15 cents per barrel will be reached when the yield of gasoline reaches 30 per cent of the charging stock.

A simple method of calculation is set forth in the company's statement, as follows:

"In order to provide as flexible an arrangement as possible for the scale below 30 per cent yield, the royalty may be calculated in cents per barrel at one-half the yield of gasoline as defined up to the 30 per cent yield, with a minimum royalty rate of five cents per barrel, which will cover up to the 10 per cent yield."

Jersey Buys Indiana Foreign Interests

SALE of the interest of Standard Oil Company (Indiana) in the foreign properties of Pan-American Petroleum and Transport Company to the Standard Oil Company of New Jersey was practically concluded May 6, according to Edward G. Seubert, president of Standard Oil Company (Indiana.

The transaction is being carried out on the basis of book value of the Pan-American foreign properties as of April 30, 1932, estimated at $146,000,000. The Jersey company's agreement with Standard of Indiana is to pay for these properties $50,000,000 in cash over a period of four years and the remainder, estimated to be $96,000,000, in shares of Jersey stock at their book value as of December 31, 1931. Standard of Indiana has agreed to transfer its interest in the foreign property, amounting to about 96 per cent, on this basis, and it is understood that all other Pan-American stockholders will have an opportunity to sell on a basis not less favorable to them.

The net result to all Pan-American stockholders will be that they will have an opportunity to accept for their interest in the foreign situation $14.65 in cash and more than one-half share of Jersey stock for each share of Pan-American stock now held by them. They will have remaining an interest in Pan-American's domestic properties amounting to approximately $10.00 in cash or its equivalent, and approximately $14.00 book value of additional assets per share.

Book values were agreed upon as the basis for the deal as being fairer to both parties than an attempt to arrive at market values under the present disturbed conditions.

Standard of Indiana will receive out of the total consideration approximately $48,000,000 in cash and 96 per cent of the Jersey stock payment.

The deal will materially improve the company's position in relation to the world trade in oil. The foreign properties in which it has been interested have been dependent in large part upon outlets in the United States. If the threatened tariff on oil should be adopted they would be obliged to seek additional outlets abroad in competition with established companies and at great cost. Standard of New Jersey, on the other hand, is in position to provide foreign outlets by a mere adjustment in flow of business. By exchanging its interest in the Pan-American foreign properties for an investment in the Jersey company Standard of Indiana will insure itself against loss through tariff developments and put itself in position to share not only in any benefits which the Jersey company may gain from the transaction, but also in the earnings of that company's entire business, both foreign and domestic.

Pan-American will organize a new holding company and transfer its foreign holdings to the new corporation in exchange for its entire capital stock. This stock in the new corporation Pan-American will distribute to its present stockholders on a share for share basis.

When this formality is carried out, each Pan-American stockholder will hold one certificate representing his interest in the foreign properties and one representing his interest in the domestic properties, in place of a single certificate which previously represented both.

Cash and marketable securities amounting to approximately $35,000,000 and properties of a book value of approximately $48,000,000 will remain in the Pan-American domestic set-up in which the Indiana company retains its full interest.

The domestic business will receive its petroleum supplies from the same sources if a tariff is not adopted. If one is adopted, supplies have been arranged for from domestic sources.

Safety Bulletin By Bureau of Mines

SELECTING and Training the Refinery Personnel to Prevent Accidents" is ready for distribution by the Bureau of Mines as Report of Investigations, R. I. 3164. Copies of this valuable and interesting prepared discussion by R. L. Marek, Associate Petroleum Engineer, can be secured free by writing Section of Publications, United States Bureau of Mines, Washington, D. C. The 28-page book covers the matter of personnel training thoroughly, and is illustrated by charts, tables and forms, which add to the interest and value of the work.

ECONOMICS

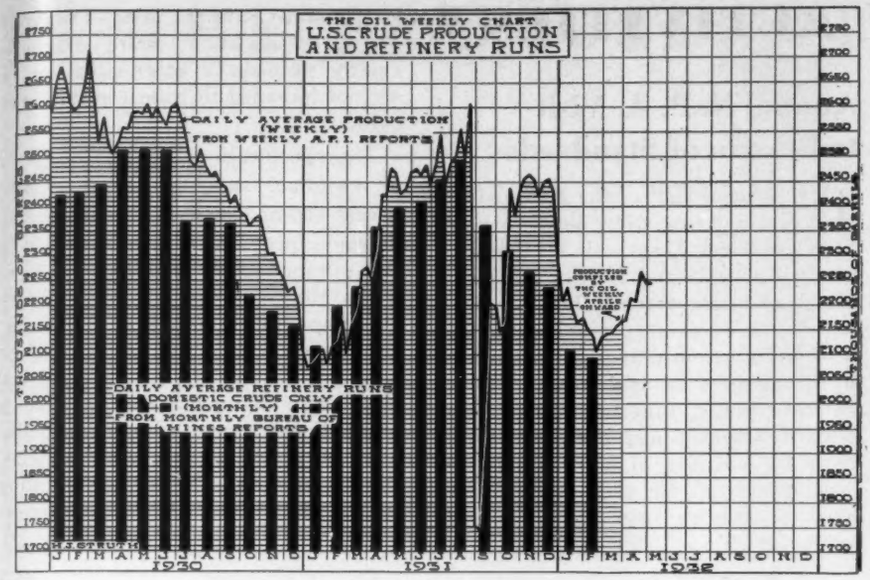
H. J. STRUTH, *Staff Economist*

Price Structure Continues Firm

WHOLESALE and retail prices of refined products continue to exhibit a firm tone in all refining areas east of California. Gasoline spot market has shown but little variation from standard, although some instances have been noted where offerings are made at less than the general market average. It has also been noted that a considerable share of the floating supply of gasoline is being absorbed by the major companies. With an outlook for materially large consumption almost immediately, it appears that the major companies are preparing for the season of heavy consumption by taking all available offerings of gasoline. This practically assures continued market strength well into the summer season. Retail prices continue to go up. On April 30, advances of one-half to one cent a gallon were announced in the East and in Indiana territory. May 3 marked the third increase in retail gasoline in the Southwest territory.

Crude Runs to Stills About Normal

REFINERY runs of crude to stills have been maintained at an approximate normal level during the past few



weeks. As a result, late figures of the American Petroleum Institute show that gasoline stocks are being reduced substantially. For the week ending April 30, gasoline stocks dropped 882,000 barrels, or at the rate of about 126,000 barrels a day. This was accomplished despite the fact that still runs were increased about 24,000 barrels a day over the preceding week. Runs to stills at all U. S. refineries for the week ending April 30 averaged about 2,362,000 barrels a day. Stocks of gasoline reported by refineries to the American Petroleum Institute aggregated 46,403,000 barrels, compared with 47,285,000 barrels in the preceding week.

Crude Production Steady

CRUDE production is being maintained at a daily average of about 2,245,000 barrels and reveals continued efforts to control output within the limits set by demand practically everywhere except in California. Pacific Coast operators have failed to hold production in check, with the result that stocks have increased substantially during the past several months. East Texas, where drilling has proceeded with unabated intensity, has fallen in line with new proration orders and production of that area is only slightly above the field allowable of 325,000 barrels daily.

Drilling Showing Upward Trend

DOLLAR oil has to some extent already made itself felt in the degree with which new wells are being completed. April field operations showed an increase over March of 107 wells and a sharp gain in alleged potential capacity of producing wells completed. Drilling has shown unmistakable signs of definite increase particularly in Oklahoma, Kansas, East Texas and the Rocky Mountain States. However, results for April were almost wholly influenced by developments in East Texas. There, new well completions rose to 490, from 351 in March. Total well completions in the United States in April amounted to 1070, compared with 963 in March. Crude oil production in April was about 66,857,919 barrels, a daily average of 2,228,597 barrels. This represented an increase over the daily output for March of 71,547 barrels.

Imports Adding to U. S. Storage

MORE than 71,000 barrels of foreign oil is being added to American storage each day, as a result of increasing imports to the extent where the income is greater than outgo. Imports of all oil in the four weeks ending April 30 averaged 337,714 barrels a day, while exports have only amounted to about 266,000 barrels a day. This is the first time in years that the balance in trade has been unfavorable.

Crude Runs to Stills, Gasoline and Gas and Fuel Oil Stocks—Cracked Gasoline Production

District	Crude Runs to Stills—Total	Crude Runs to Stills—Daily Average	Crude Runs to Stills—% Operated	Gasoline Stocks (see note below)	Gas and Fuel Oil Stocks	Potential Charging Capacity (Daily) Reporting	Potential Charging Capacity (Daily) %	Production—Total	Production—Daily Average
East Coast	3,104,000	443,400	70.0	7,367,000	5,743,000	236,300	94.1	591,000	84,400
Appalachian	761,000	108,700	79.1	1,819,000	1,137,000	54,100	96.1	185,000	26,400
Ind., Ill., Ky.	2,171,000	310,200	71.9	6,515,000	4,031,000	315,400	95.5	704,000	100,600
Okla., Kans., Mo.	1,634,000	233,400	53.6	3,764,000	3,215,000	219,500	92.3	364,000	52,000
Texas	3,752,000	536,000	70.0	8,151,000	8,601,000	436,200	96.8	703,000	100,400
Louisiana-Arkansas .	1,059,000	151,300	65.6	1,997,000	4,538,000	112,400	100.0	212,000	30,300
Rocky Mountain	317,000	45,300	31.5	2,021,000	622,000	98,400	98.5	90,000	12,900
California	3,167,000	452,400	51.2	14,769,000	96,024,000	190,800	100.0	263,000	37,600
Total April 30	15,965,000	2,280,700	62.3	46,403,000	123,911,000	1,663,100	95.6	3,112,000	444,600
Total April 23	15,803,000	2,257,600	61.7	47,285,000	124,326,000	1,663,100	95.6	3,076,000	439,400
Total April 16	15,908,000	2,272,600	62.1	46,733,000	123,874,000	1,663,100	95.6	3,106,000	443,700
Total April 9	16,052,000	2,293,100	62.6	47,171,000	123,521,000	1,663,100	95.6	2,948,000	421,100
Total April 2	15,386,000	2,198,000	60.0	46,519,000	124,110,000	1,663,100	95.6	2,922,000	417,400
Total March 26	15,232,000	2,176,000	59.4	46,726,000	124,173,000	1,663,100	95.6	3,021,000	431,600
Total May 2, 1931 ..	16,795,000	2,399,300	67.2	*45,014,000	127,637,000	1,508,500	94.9	3,105,000	443,600
The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.									
Texas Gulf Coast	3,056,000	436,600	82.1	6,596,000	5,819,000	347,400	98.6	552,000	78,900
La. Gulf Coast	770,000	110,000	74.6	1,853,000	3,849,000	77,000	100.0	149,000	21,300

NOTE: Stocks at refineries, except in California, district, which includes stocks of finished gasoline and engine distillate at refineries, water terminals and sales distributing stations and amounts in transit thereto.

*This figure is not entirely comparable with current stock due to revisions made since original publication of this figure, for which revisions the basic information is not available by weeks. If it were possible to have made the revision, the new figure would reflect somewhat lower stocks.

▼ ASSOCIATION ACTIVITIES ▼

N. P. A. Announces Convention Dates

NATIONAL PETROLEUM ASSOCIATION has announced that the next two general meetings are as follows: Thirtieth Annual Meeting, Hotel Traymore, Atlantic City, New Jersey, September 14, 15 and 16, 1932, and the Thirtieth Semi-Annual Meeting will be held at Cleveland, Ohio, Cleveland Hotel, April 20 and 21, 1933.

Professor Taylor A.S.T.M Marburg Lecturer

PROFESSOR HUGH STOTT TAYLOR, who is chairman of the Chemistry Department at Princeton University, has been chosen to deliver the Edgar Marburg Lecture at the 1932 Annual Meeting of the American Society for Testing Materials in Atlantic City in June. This lecture, an annual feature, was established in 1926 as a means of emphasizing the importance of that phase of A. S. T. M., work which deals with the promotion of knowledge of engineering materials. The lecture commemorates the name of the society's first secretary-treasurer, who, through his development of technical programs over a period of 16 years, brought wide recognition to the society as a forum for the discussion of various aspects of materials used in engineering fields.

The Oil Man's Calendar

MAY
17-19 *Natural Gasoline Association of America, Tulsa, Oklahoma.*
20-21 *Virginia Oil Men's Association Staunton, Virginia.*

JUNE
1- 3 *American Petroleum Institute Mid-Year Divisional Meetings, Tulsa, Oklahoma.*
6- 9 *National Association of Purchasing Agents, Detroit, Michigan.*
20-24 *American Society for Testing Materials, Atlantic City, New Jersey.*

AUG.
23-26 *Pacific Coast Gas Association, Spokane, Washington.*

SEPT.
14-16 *National Petroleum Association, Atlantic City, New Jersey.*
15-17 *American Trade Association Executives, Atlantic City, New Jersey.*

OCT.
10-14 *American Gas Association, Atlantic City, New Jersey.*

NOV.
15-17 *American Petroleum Institute (Annual), Houston, Texas.*

Annual N. P. A. Visit to Bureau of Standards

THE annual visit of the National Petroleum Association department of Standards and Tests will be held this year on June 10 and 11 with Shoreham Hotel as headquarters. The two days will be given over to visiting the Bureau and a group dinner to be featured by discussions of analytical problems, Friday evening, June 10. All tests will be demonstrated and then interpreted with the purpose of pointing out the significance of the test and to show what it means from a commercial standpoint.

Proposed W.P.R.A. Motor Fuel Specifications

THE proposed specifications for summer and winter types of motor fuel which were passed for approval to the board of directors at the twentieth annual convention of the Western Petroleum Refiners Association, do not differ greatly from current U. S. Government motor fuel specifications, the differences being the retention of initial boiling point, gravity and end point specifications. Although the refining industry has for years been trying to get away from such specifications and current Federal requirements take no cognizance of them, the membership of the association expressed the view that such government specifications are not sufficiently definite to cover the requirements of the majority of refiners in the Mid-Continent area. The W. P. R. A. specifications were drawn up chiefly to meet a sales situation and are not intended to reflect scientific accuracy.

The specifications cover two grades of gasoline, summer (58-60 gravity) winter (60-62 gravity) which difference in vapor pressure from 10 pounds for the summer grade and 12 pounds for the winter type of fuel. Three grades of octane rating are proposed—under 57 octane; 57 to 65 octane and 65 octane and above. The gasoline for both winter and summer are to have an end point of 420°F. and with initial boiling point of 110°F. for summer grade and 100°F. for winter. Other specifications are identical with Federal requirements.

The specifications will not influence refinery operations or consumption of crude oil. They reflect present sales practice and requirements and tend to standardize the gasoline production of refineries in the Mid-Continent area where the jobbing trade and sales departments have been having difficulty with the lack of definiteness or complete understanding of present day standard government motor fuel specifications. The difference in volatility permitted between the winter and summer grade permits the use of a little more natural gasoline or similar light blending medium during the winter months, but this is also true of government specification motor fuel. The refiners, sellers, jobbers, and others in the Mid-Continent section find, apparently, a complete understanding of former motor fuel specifications and prefer them to the newly adopted government means of interpreting motor fuel characteristics.

Proposed Specifications for Western Petroleum Refiners Association Gasoline

	Winter	Summer
Gravity A. P. I.	60-62	58-60
I. B. P.	100°F. Max.	110°F. Max.
10% Evaporated	140°F. Max.	155°F. Max.
50% Evaporated	284°F. Max.	284°F. Max
90% Evaporated	392°F. Max.	392°F. Max.
End Point	420°F. Max.	420°F. Max.
Recovery	95% Min.	95% Min.
	Without Residue	Without Residue
Doctor	Sweet	Sweet
Non-Corrosive	3 Hrs. at 122°F.	3 Hrs. at 122°F.
Color	Plus 25 Min.	Plus 25 Min.

Filtration through one thickness of filter paper shall be permitted.

Gum Content (Copper Dish) 30 mg/100 cc Max. 30 mg/100 cc Max.
Gum as determined by average of 3 determinations run simultaneously.

Vapor Pressure—Reid Method 12 lb. @ 100°F. Max. 10 lb. @ 100°F. Max.

Sulphur	0.1% Max	0.1% Max.
Acidity	None	None

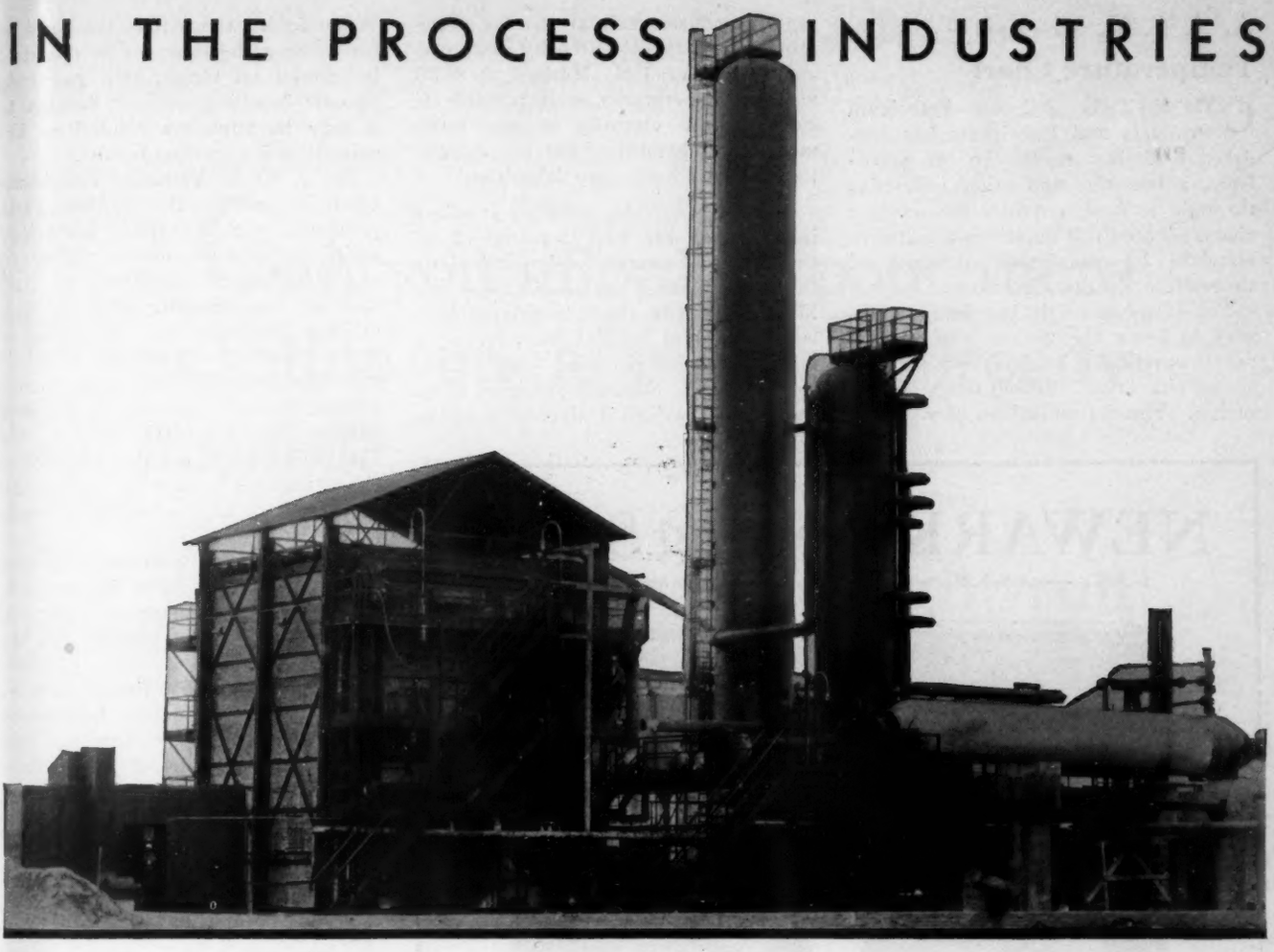
All methods of testing shall be in accordance with A.S.T.M. methods.

There shall be three grades of gasoline of the above specifications. These grades to be—Under 57 octane; 57 to 65 octane, and 65 octane and above.

Octane Number—To be determined in accordance with the standard method prescribed by the Standard Oil Development Company, using the "CFR" engine or Ethyl Corporation Series "30" engine, and reference fuels A-2 and B-2.

It is distinctly understood that all specifications are for gasoline in bulk at point of delivery.

IN THE PROCESS INDUSTRIES



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A. S. T. M. Viscosity-Temperature Chart

COMMITTEE D-2 on Petroleum Products and Lubricants has rendered a distinct service to the petroleum, automotive and other industries through a new viscosity-temperature chart, adopted this month as a tentative standard by unanimous approval of Committee E-10 on Standards.

For many years it has been necessary to know the viscosity of various petroleum liquids, conspicuously lubricating oils, at the varying temperatures of use. The determination of viscosity requires considerable time. By determining the Saybolt Viscosity in accordance with A.S.T.M. Method D 88-30, at two temperatures, it is possible to calculate the viscosity at any intermediate temperatures, but the calculations involved are very laborious.

The new A.S.T.M. tentative standard incorporates the best features of all the previous charts used, particularly the generally used charts of Larson and MacCoull. The chart is printed in a large size, 16½ by 21½ in., covering a temperature range from —30° F. to 450° F. and a viscosity range of 37 to 100,000,000 Saybolt Universal seconds. When folded twice it is the right size for filing with letters or in reports. It is printed on tough, thin paper that permits handling without damage and it may be ammonia printed or blueprinted with excellent results.

The A.S.T.M. Viscosity-Temperature Chart is useful for the solution of many problems, such as those involving a prediction of performance under varying temperature conditions of crankcase oil, free-wheeling lubricant, transmission lubricant, etc. Engineers and other scientists interested in friction and heat calculations are particularly pleased with the chart, since a convenient, accurate kinematic viscosity scale has been placed on the edge of the chart, making it easy to convert Saybolt seconds to fundamental viscosity units.

In addition to petroleum products the chart may be used for any other liquid, such as castor oil, glycerine, lard oil, coal tar products, etc., with good results.

It is expected that these charts will be available at Society headquarters about April 10 at 25 cents per single copy; $1.50 per pad of 25, or $5 for four pads.

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Newark Testing Sieves are made of wire cloth specially woven to conform with the nominal values formally adopted by the U. S. Bureau of Standards and by the American Society for Testing Materials. Painstaking selection of wires of exact diameters makes it unnecessary for Newark to take advantage of generous tolerances. In other words only special specification cloths are used on Newark U. S. Standard Testing Sieves.

Furthermore Newark's strict adherence to nominal wire diameters always assures a uniform and greater percentage of open area—an important feature that is rapidly becoming recognized.

Specifications—

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No crevices for lodgment of particles between cloth and frame.

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S. A. E. Summer Meeting

THE Society of Automotive Engineers will hold its annual summer meeting at White Sulphur Springs June 13-17, the program including a number of studies of interest to the refining industry, especially from the standpoint of gasoline characteristics, and trends in automotive design as they affect motor fuels.

Code for Tubular Heat Exchange Equipment

A SPECIAL committee of the Petroleum Division of the American Society of Mechanical Engineers has tentatively drafted a code for tubular heat exchange equipment. Copies of the proposed code are ready for distribution and can be secured from association headquarters at 29 West 39th Street, New York. Written comments on the proposed code are desired by the committee. A public meeting on this code will be held in Buffalo, June 6 during the National Process Meeting of the association. The code was prepared following a suggestion by Walter Seamans, chief engineer, Atlantic Refining Company, in a paper before the petroleum division of the A.S.M.E. about a year ago. The personnel of the committee drawing up the code is as follows:

R. R. Collins, vice president, The

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Lummus Company; George Gibson, sales engineer, C. H. Leach Company; A. C. Gronbeck, manager New York office of Southwestern Engineering Corporation; M. B. Higgins, chief designer, The Texas Company; D. S. Mallett, designing engineer, Tide Water Oil Company; E. H. Barlow, manager and assistant chief engineer, Standard Oil Development Company; Walter Samans, chief engineer, Atlantic Refining Company; E. N. Sieder, manager, heat exchange department, Foster Wheeler Corporation; and C. J. Wahl, manager, heat exchange department, M. W. Kellogg Company.

Mid-Year A. P. I. Program Outlined

TECHNICAL advancement and practical achievements in the three branches of the petroleum industry, producing, refining and marketing, will be reviewed at the Mid-Year meeting of the American Petroleum Institute, Tulsa, June 1, 2, and 3. At this time 35 working committees will meet and prepare their reports.

Wednesday afternoon at the first general session President Amos L. Beaty, Charles F. Roeser, vice-president for production, and Henry E. Long, commissioner of Corporations and Taxation of the Commonwealth of Massachusetts, will be the speaker. At the same session reports will be made for the two committees working on forecasts of consumption of petroleum products for the nine months period April 1 to December 31. Dr. John W. Frey, chief petroleum economist of the Bureau of Foreign and Domestic Commerce will report for the Federal Oil Conservation Board's committee of five, and Albert J. McIntosh (Standard Oil Company of New York) will report as chairman of the Institute's statistical sub-committee designated to make a statistical survey and economic forecast of the refining situation.

The refining group will discuss utilization of petroleum gases, refining development, processes and problems and anti-knock rating of motor fuels. The production division will discuss production problems, drilling and practices, and the marketing division is scheduled to study gasoline tax evasion and general marketing problems.

With a few speakers yet to be announced, those on the program for the refining division program are: Alois Kremser, California; G. G. Brown, University of Michigan; G. G. Oberfell, Phillips Petroleum Company; J. B. Rather, Standard Oil Company of New York; William Mendius, Sinclair Refining Company; P. Dashiel, United Gas

1 + 1 = 2

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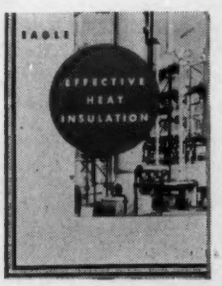

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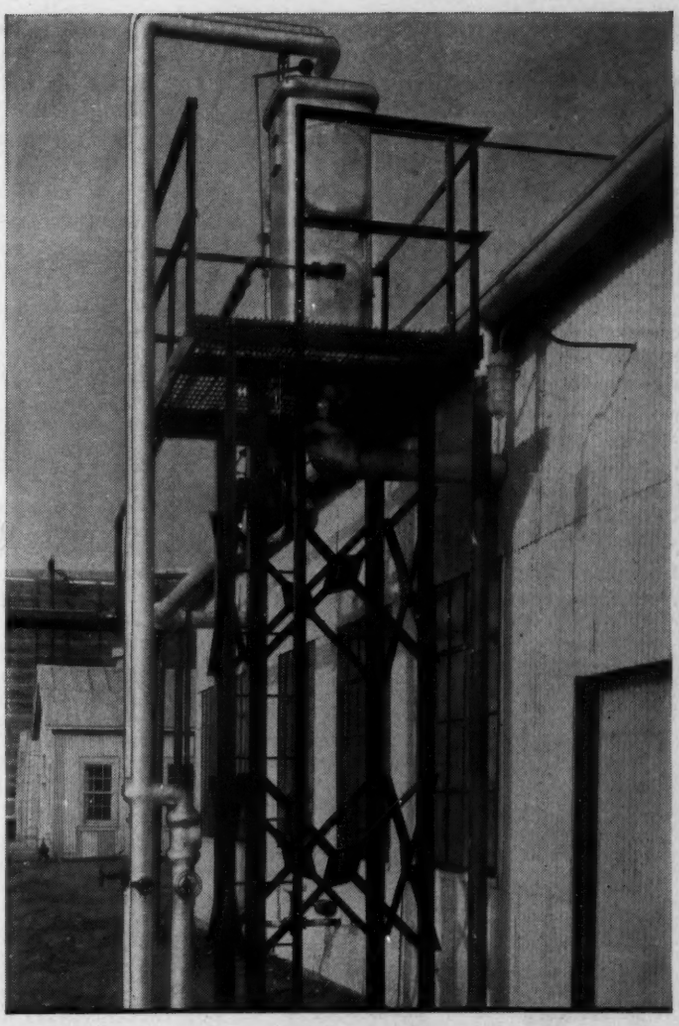

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Improvement Company; T. G. Delbridge, The Atlantic Refining Company; G. L. Neely, Standard Oil Company of California; Ross C. Powell, The Texas Company; W. S. Gullette, Sinclair Refining Company, and T. A. Boyd, General Motors Corporation.

Course in Refinery Engineering

THE University of California (State University) Extension Division has announced a course in Refining and Utilization of Petroleum Products to be given on Friday evening 7-9, beginning May 20, at the Extension center, 815 South Hill Street, Los Angeles. The course covers general principles of petroleum refining, and detailed outline of methods of manufacturing lubricating oils and greases. The first class meeting is open to the public.

The instructor, Martin J. Gavin, district manager of Foster Wheeler Corporation, is well qualified to conduct this course. He has been field chemist for Shell Oil Company, research chemist for Union Oil Company, and refinery engineer for the U. S. Bureau of Mines.

▼ PERSONALS ▼

Davis Again Heads Oil & Gas Association

MID-CONTINENT Oil & Gas Association again elected William N. Davis, vice president of Phillips Petroleum Company, as president of the association, making his twelfth consecutive year in this capacity. Election occurred at the meeting of the executive committee April 15, at Tulsa.

T. C. Johnson, Wichita, Kansas, was re-elected vice-president for Kansas, J. R. Crawford of Shreveport was re-elected vice-president for Louisiana, as was a J. M. Hervey, Roswell, for New Mexico. C. C. Herndon, Skelly Oil Company, as vice-president for Oklahoma, succeeds Wirt Franklin. J. D. Collett, Fort Worth, is the new vice-president for Texas and succeeds E. A. Landreth. Harry H. Smith was re-elected secretary and treasurer.

W. E. NETHERLIN

Neatherlin Handles Black Gold Plant

W. E. NETHERLIN began accumulating refining experience about 10 years ago, first as a stillman's helper, then stillman, finally after only a few years he was made chemist in charge of the laboratory and had the treating of gasoline and kerosene to take care of at the Wirt Franklin Petroleum Corporation refinery in Ardmore.

After taking care of the laboratory and treating equipment, he became associated with M. W. Kellogg Company in the capacity of engineer assisting in the erection of refining equipment in the Eastern States.

When Black Gold Refining Company was organized, he came to Oklahoma City to take charge of the refinery there as superintendent of plant.

New Manager of Sales; New Cracking Unit

GILES M. BAILEY on May 1 became director and manager of sales for Bobrose Oil & Refineries, Inc., San Antonio, Texas. He succeeds C. F. Watson, who recently resigned. Mr. Bailey has been with Grayburg Oil Company in charge of retail sales for about 10 years, prior to joining the Bobrose organization in November, 1931. In his new position he will have charge of both refinery and crude oil sales. The company's new address is 1208 Alamo National Building.

The company operates refineries at Luling and Brownwood, and recently completed a discovery well in a new area four miles south of the Luling plant, and connected the field to refinery by pipe line. The company will, in a short time, install a modern cracking unit of approximately 5000 barrels capacity at the Luling refinery.

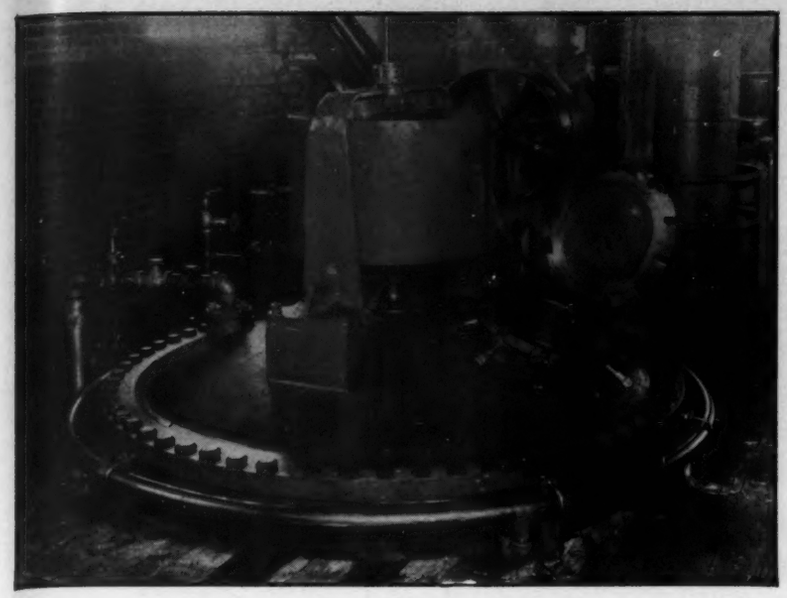
McNerney Succeeds Clark as President

J. J. McNERNEY was recently elected president of the Fred G. Clark, Inc., manufacturers and marketers of petroleum products, succeeding Fred G. Clark who resigned to devote all his time to other interests. McNerney was formerly vice president of the company and is president of Hyvis Oil Company of California. The Clark Company owns five-sixths interest in the Conewango Refining Company, Warren, Pennsylvania, and H. R. Lewis will be president of this company and vice president of Fred G. Clark Company. P. C. Girard was re-elected secretary-treasurer of the Clark company at the same meeting.

YEARS ago, when the Rock Island Refining Company began operating a refinery at Duncan, Oklahoma, Jimmie Hines was working for them. Several things arose, in particular some bubble towers, or to be more specific, towers packed with stone through which the vapors were fractionated.

Years passed, and Jimmie was with Waggoner Refining Company. Pipe stills and refining was a serious business with him, and applying himself to

JIMMIE HINES



500 gal. Dopp Pressure Mixer, one of various sizes used for making grease base under pressure, installed in modern grease plant. As compared with older methods, using pressure saponification enables you to make a uniform product in one-fourth to one-half the time formerly required, with corresponding savings in power and labor.

Users report . . .

"WE MAKE BETTER GREASE AT LOWER COST *with Dopp Pressure Mixers*"

EXTREME bearing pressures and high gear speeds, both in automotive and industrial service, cause increasing demands for more serviceable greases with improved anti-friction qualities. In such new greases uniformity of product is of prime importance and must be maintained —so that consistency, homogeneity and other properties shall not vary from batch to batch, or from shipment to shipment.

Grease makers now saponifying their lime and soda soaps in Dopp Pressure Mixers tell us that these Mixers provide this essential product uniformity through more complete saponification and more accurate moisture control. (For example, one user reports only one off-quality batch in the first 12 months' operation.) Others report that Dopp Pressure Mixers have enabled them to manufacture new products impossible in ordinary equipment — such as lead grease free from uncombined litharge or metallic lead.

In addition these users report that they can manufacture grease at lower cost. Under pressure, saponification is completed in a small part of the time required for saponification in open kettles. This time is still further reduced by Dopp exclusive seamless kettle construction with scraping agitators which speed up heat transfer by preventing any heat insulating soap layer from building up on the kettle's heating surface.

Actual working data supplied by these users show that, with Dopp Pressure Mixers, total time required to make a batch of grease has been reduced to one-half or one-fourth of the total time formerly required, with power and labor cost-savings in proportion.

Dopp Pressure Mixers can be installed to work in conjunction with your present grease kettle equipment. Using your open kettles only for finishing, each Dopp Pressure Mixer will provide sufficient grease base to keep two or more open kettles working at capacity.

In the Dopp Experimental Department you can make test batches under pressure with your own materials. These tests will show you exactly what pressure saponification will accomplish for your present products, or for new products you may be considering; they will also enable you to determine how much Dopp Pressure Mixers will cut your costs on your present grease production, in advance of any equipment purchase.

We make no charge for your use of the Dopp Experimental Department; there is absolutely no expense to you except for your own time and materials. Whatever the outcome of your tests here you are not under any obligation to purchase Dopp Equipment. We offer this service simply because it provides the quickest, simplest demonstration of the improved quality and lowered costs you can expect with Dopp Equipment.

For further information write for our new Catalog No. 8; we shall also be glad to include copies of technical discussions giving photos, facts and figures concerning actual installations of pressure saponification equipment in important grease plants.

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the problems then confronting the refiners, he developed some interesting layouts. After operating for Waggoner for a long time, he was asked to take charge of refinery construction at Olney, building and designing the plant of Olney Refining Company.

The first of April, 1932, Taxman Refining Company went back on stream and he was asked to take charge of the refinery at Wichita Falls. Treating gasoline is a special hobby of his, if one should call his work a hobby. Through development of some of the processes, he was instrumental in starting a continuous treater for kerosene. The contactors were designs of his, and were applied later in another plant. His positive flow bubble caps for refineries have a peculiar design enabling them to be set in one position for refluxing, and in another way for absorption.

Fastnow, American General Manager

J. C. FASTNOW has been made general manager of the American Refining Properties, Wichita Falls, Texas, to succeed E. H. Eddleman, who resigned in December to become executive vice president of the Texas Oil & Gas Conservation Association. A. W. King was made assistant manager at the same time.

Mark Finston of Bell Oil and Gas Company Dies

MARK FINSTON, organizer and president of Bell Oil & Gas Company of Tulsa, Oklahoma, died at Tulsa, April 12, after an illness of several weeks. Mr. Finston organized Bell Oil & Gas Company about 15 years ago, and was later joined by his two brothers, Albert and Jesse Finston, who survive him.

Holtzclaw Goes With Standard Development

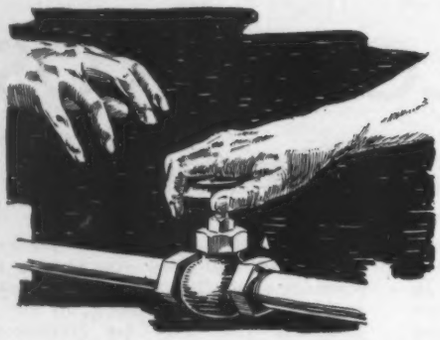
JOHN B. HOLTZCLAW, formerly employed as chief chemist with the Kentucky Highway Department, Frankfurt, Kentucky, is now research chemist with the Standard Oil Development Company, Elizabeth, New Jersey.

Skinner Has Wide Construction Experience

E. M. SKINNER graduated from Oklahoma Agricultural & Mechanical College at Stillwater in 1925 with the degree of B. S. in chemistry. Immediately afterwards he was employed by Skelly Oil Company and sent to the Lyman district as utility engineer in the gasoline department. While work-

E. M. SKINNER

Who turns the handle in *your* plant?



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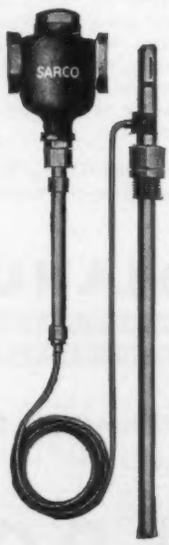

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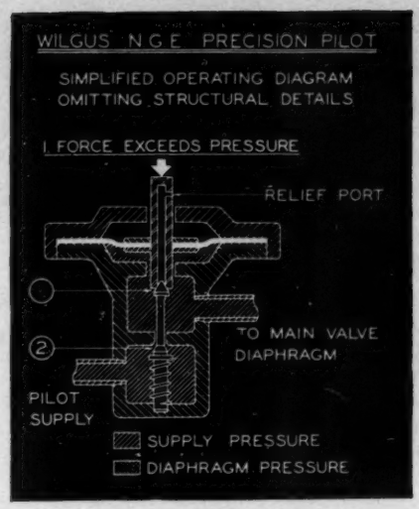
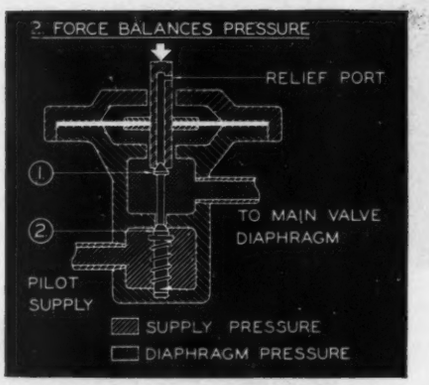
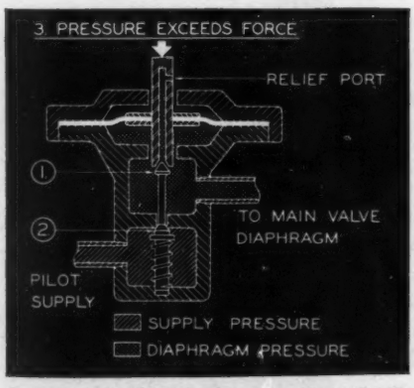


1. INCREASED ACTUATING FORCE *due to change in pressure or level being controlled slightly depresses pilot diaphragm and momentarily opens Valve 2, admitting enough supply pressure to main valve diaphragm to establish equilibrium under new conditions; immediately returning to position shown in Diagram 2.*

SIMPLE AS MOST BIG IDEAS ARE...



2. CONSTANT ACTUATING FORCE *at all times when pressure or level being controlled is unchanged, holds both pilot valves closed and maintains constant pressure on main valve diaphragm, with no circulation of operating medium whatever.*



3. DECREASED ACTUATING FORCE *due to change in pressure or level being controlled momentarily opens Valve 1, relieving enough pressure from main valve diaphragm to restore equilibrium under the new condition; returning immediately to position 2.*

. . . this Wilgus-N. G. E. Precision Pilot that is revolutionizing pressure and liquid level control!

A MAJORITY of modern stabilizer and debutanizer plants recently built in the Mid-Continent and East installed Wilgus-N. G. E. *Precision Pilot* Liquid Level Controllers or Pressure Regulators. Every major California company has modernized existing plants by converting to this equipment . . .

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ing there, he received the Natural Gasoline Association Fellowship which entitled him to receive instruction at the University of Michigan in Ann Arbor. Working directly under Dr. G. G. Brown, he did work which led to the degree of Ph. D.

After 26 months of intensive study at Ann Arbor, he was employed by Smith Engineering Company as technical director, assisting in the design and erection of plants constructed by that company. Two of these were built in Arkansas and Kansas, the Elliott Vacuum unit in the yard of Lion Oil Refining Company at Eldorado, Arkansas, and the other, the largest unit built using Winkler-Koch layout, installed in the refinery of Skelly Oil Company at El Dorado, Kansas.

During the summer of 1931 he was retained by Rock Island Refining Company at Duncan, Oklahoma, as refinery engineer to assit in the design and operation of new units installed by that company.

Cooper-Bessemer Promotes Hudgins to Sales Manager

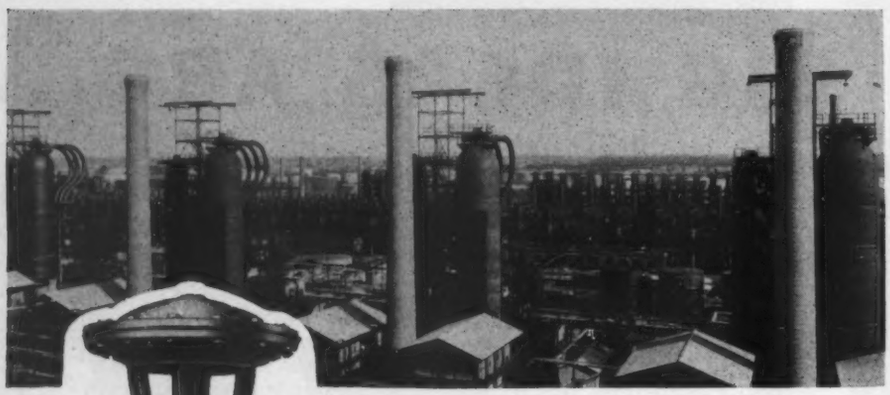
AFTER nine years service in the sales and engineering departments of C. & G. Cooper and more recently in the Cooper-Bessemer Corporation, T. F. Hudgins has been promoted to the position of general sales manager with headquarters at Mt. Vernon, Ohio. Mr. Hudgins has been vice president and western sales manager with offices in Tulsa.

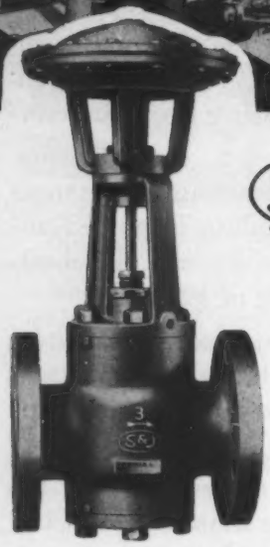
Succeeding to the position vacated by the death of Mr. Thomas in March of this year, Mr. Hudgins will have supervision over all sales of the company throughout the country.

Entering the oil and gas industry in 1916 after leaving the staff of Perdue University, Mr. Hudgins was associated with the Columbia Gas & Electric Company and after service in the army in 1917 and '18 he returned to the United States in 1919 and took up his work with Columbia Gas and United Fuel Gas. In 1919 he accepted a position with National Supply Companies and shortly thereafter came to the Mid-Continent field.

Again going abroad in 1921 to assist in opening a London office for National Supply Companies, Mr. Hudgins remained in England about a year and on his return to the United States continued with that organization until 1923 when he joined the C. & G. Cooper Company and opened offices in Tulsa with supervision over the Mid-Continent area. When C. & G. Cooper Company and Bessemer Gas Engine Company merged Mr. Hudgins was made a vice president and a director with title of western sales manager in charge of all territory west of the Mississippi River. He was appointed to his new position in March.

T. F. HUDGINS





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We also manufacture many other safety and measurement devices to meet the needs of modern refineries. Ask for Bulletin No. 52.

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PLANT ACTIVITIES

REPORTS of construction activity in the refining branch of the petroleum industry for the month past indicate continued aggressiveness on the part of the larger units especially, to get their manufacturing facilities in better shape to produce more high anti-knock motor fuel. Several additions to cracking departments were announced and further activity in the construction of gasoline reforming units was noted.

One new refinery for the Ohio-Michigan territory was announced and new modernization programs are contemplated for refineries in Oklahoma and Kansas. For the first time in several weeks a new natural gasoline plant was announced, this time in California where a new field yielding gas sufficiently rich in gasoline to warrant extraction was brought in.

A continually depressed fuel oil market is causing refiners to give more attention to the disposition of fuel oil and heavier distillates, in order that these products may be made to yield their available content of gasoline. One of the larger refineries in the Chicago area, operating refineries in Illinois and Indiana, which has been a large marketer of distillates and fuel oil has informed the trade that this supply will be reduced through the installation of additional cracking facilities at its plants, which will be used to process these heavier oils for the production of additional high anti-knock gasoline. A study of proper methods of selecting cracking stocks, which is governed largely by the type of crudes available, has lead other refineries to install additional coking equipment through the operation of which better cracking stock is secured for production of better motor fuels and in higher yields.

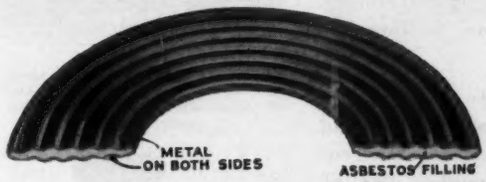
Reports from the east are to the effect that Standard Oil Company of New Jersey's action in acquiring the Pan-American Petroleum & Transport Company's Aruba Island refinery and its South American and Mexican poduction, will cause at least one other major company to give serious consideration to the plan of erecting a large refinery in the Caribbean section in order to protect its Venezuelan oil production.

It is estimated that there remain 155 refining companies of various degrees of importance, not yet engaged in the cracking of distillates or residues, while a total of 125 companies are engaged in cracking. The present trend toward motor fuels of higher octane rating and the increasing evidence that automobile manufacturers are desirous of still further improvements in motor gasolines is indicative of a condition wherein refineries not engaged in cracking will of necessity soon have to make changes in their manufacturing methods to the end that their products can compete with quality products distributed by concerns operating cracking facilities. Many of the 155 companies are not financially able to swing a costly deal such as involved in the purchase and erection of a modern cracking plant, and it is thought that in several instances such concerns may work out partnership arrangements similar to that recently completed in Pennsylvania where several refiners pooled resources and erected modern cracking facilities.

New Construction

Cracking Unit

Blue Island Refining Company, operating a small skimming plant in suburban Chicago, is reported having plans drawn for the construction of a new vapor-phase cracking installation.



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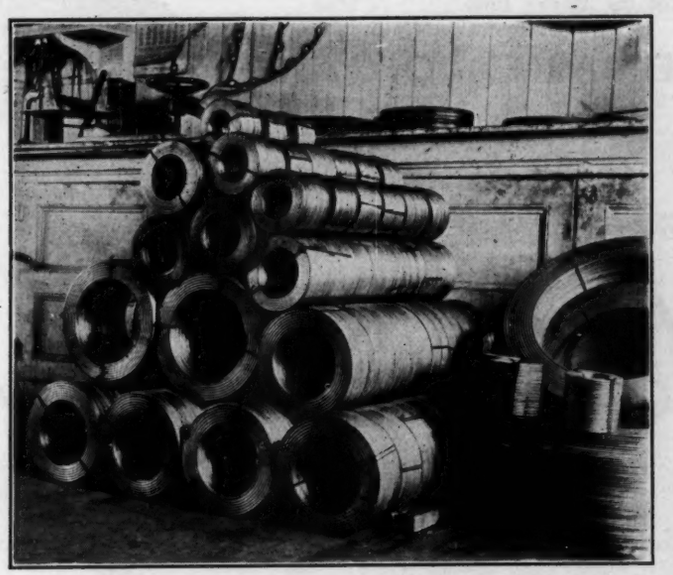

Recent shipment of 3,180 Metallo Style 1000 Refinery Type Gaskets for Series 30 flanges

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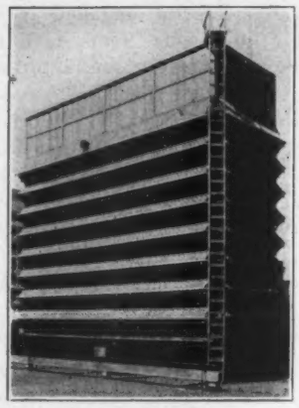
MARLEY cooling systems are outstanding in performance and economy because they are outstanding in design.

The Marley patented spray nozzle contributes simplicity to their construction. It provides improved distribution. It assures more complete water break-up. It lowers pumping costs and increases cooling efficiency.

Other advantages include: standardized construction; the Marley patented louvred louvre that controls and increases air circulation in deck towers; a complete line of forced draft towers featuring *spray distribution as standard equipment.*

These and other advantages account for the widespread use of Marley cooling systems. When you plan new installations or the improvement of old ones, write for details of the Marley line.



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Marley patented spray nozzle—the foundation of the efficiency and economy of all Marley cooling systems.

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Refinery

California-Texas Leasing Company, J. F. Sadler, 810 South New Hampshire Ave., Los Angeles, California, and Presidio Petroleum Company, Presidio, Texas, (H. W. Rowe, Midland, Texas), are reported planning construction of a refinery at Topolobampo, Mexico, (to include pipe line from Midland to Topolobampo) according to item in Chem. & Met. Eng., April, 1932.

Modernization

Crown Central Petroleum Corporation, Houston, reported last November as contemplating enlargement of its cracking department, installation of a 5000 barrel lubricating oil manufacturing department (Ref. & N. G. M., November, 1931, page 147) is again reported to be giving consideration to the proposed modernization program. The present plant is equipped with shell still batteries for distillation and old type Holmes-Manley cracking units, one pipe still rerun unit and auxiliaries.

Cracking Unit

H. H. Cross Company is reported planning erection of vapor phase cracking equipment at its Joliet, Illinois, refinery, which is now a skimming plant with capacity rating of 2500 barrels daily.

Reforming Unit

Empire Oil & Refining Company, at its Ponca City, Oklahoma, refinery, is erecting a 2000 barrel reforming unit to replace cracking equipment of Doherty type erected about 10 years ago. The new reforming unit is also called Doherty process, but changes in design permit charging light stock to produce higher octane rating motor fuels. The new equipment is to be ready for operation in July.

Rebuilding

Magnolia Petroleum Company, following a fire at its gas plant in the Beaumont refinery with damage estimated at $250,000, plans to rebuild the razed department in the near future. Four men were injured in the explosion.

Cracking Unit

Maple Leaf Petroleum, Ltd., organized late last year to take over and operate Maple Leaf Oil & Refining Company, Coutts, Alberta, Canada (Ref. & N. G. M., December, 1931, page 133), announced that it would expand capacity and later install cracking equipment. Imperial Oil, Ltd., is reported to have an interest in the new organization. The neighboring plant at

Coutts, Northwest Stellarine Company, Inc., where Hope Engineering & Construction Company is in control and operating the plant, is being equipped with Dubbs cracking equipment. These two deals indicate that Imperial Oil, Ltd., will not build the proposed western Canadian refineries mentioned in reports a year or so ago.

Refinery

The Pure Oil Company is building a 5000-barrel refinery at Midland, Michigan, on a 40-acre site adjacent to the plant of the Dow Chemical Company. Crude supply is brought to the plant through the company's six-inch pipe line from the Mount Pleasant field. The plant will be tube still and fractionating column type, with gasoline recovery and stabilization system. Company engineers designed the equipment which is being installed by Alco Products, Inc. Operation is scheduled to begin in August.

Gasoline Plant

Refugio Gasoline Company has been formed by R. J. E. Hicks, L. M. Emlet and A. G. Miller, 2006 Neils Esperson Building, Houston. The company contemplates erection of a natural gasoline plant in the Refugio field, Texas.

Improvement

Sinclair Refining Company (Consolidated Oil Corporation) is planning to modernize its Sand Springs, Oklahoma, and Coffeyville, Kansas, refineries, according to announcement by D. T. Pierce, assistant to H. F. Sinclair at Tulsa, recently. The Sand Springs plant consists of skimming, cracking and lubricating oil manufacturing facilities, while the Coffeyvile plant is equipped only with skimming and cracking equipment. Replacement of parts and general modernization is scheduled.

Alkali Plant

Southern Alkali Corporation, subsidiary of Pittsburgh Plate Glass Company and Columbia Alkali Corporation, which last year acquired a plant site at Corpus Christi of 360 acres, is apparently nearer fruition of its plans to erect a large alkali plant in the Gulf Coast territory, inasmuch as the company has purchased gas rights on 2678 acres in the Saxet area, Nueces County, near Corpus Christi, at an estimated price of $255,000. This deal and other contracts entered into apparently assured the new plant with fuel supply.

Gasoline Plant

Southern Gasoline Company, is erecting an absorption type natural gasoline plant for the purpose of processing the

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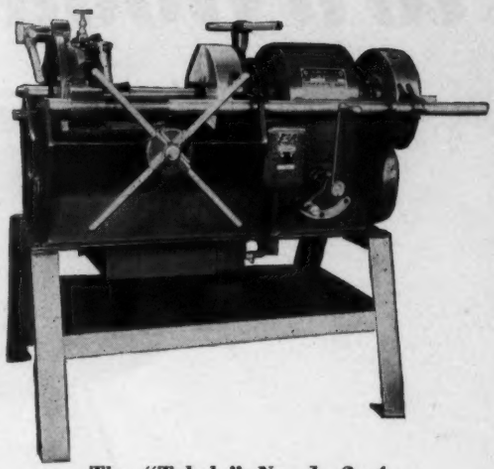

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gas from Continental Oil Company's Grubb No. 1 well at San Miguelito, California. The plant is being erected at the foot of the hills on the Ventura-Santa Barbara highway. Capacity is 10,000 gallons per day from gas yielding 1½ gallons per 1000 cubic feet. Southern Gasoline Company was organized by the same interests owning Western States Gasoline Company, operating at Kettleman Hills.

Rebuilding

Terra Bella Refining Company is rebuilding its refinery at Terra Bella, California, under the supervision of A. V. Raplee, in charge. The plant will utilize a new 300-barrel distillation unit, and orders have been placed for agitators, filter press, compressor and redistillation unit.

Refinery

Vacuum Oil Company, according to advices from Melbourne, Australia, as reported in The Petroleum World, London, has been considering construction of a modern refinery at Fisherman's Bend, Port Melbourne. Reports state that construction has been delayed because of a threatened alteration of the government's fiscal policy relating to oil.

Refinery

Valley Refining Company is erecting a 500-barrel skimming type refinery at McAllen, Texas, to refine oil from the Los Olmos pool, Starr County. This plant was first announced in these columns, March, 1932, page 72 A, as being constructed by Walter K. Campbell, Wichita Falls. With him is associated Roy B. Jones, president of the Panhandle Refining Company, Wichita Falls, as vice-president. James E. Campbell, Wichita Falls, is secretary and treasurer. For the present the plant will be skimming type, with plans to install cracking equipment later, and possibly lubricating oil manufacturing facilities.

Refinery

Whepley Oil Company is again planning to build, or to interest capital in the building of a refinery to handle its Kettleman Hills Royalty oil, according to reports from California. Company reports that A. H. Stiles of Los Angeles has offered to erect a plant at Huron, on the Southern Pacific Railroad's Coalinga branch line, and convenient to Kettleman Hills. Another report states that un-named parties have offered to erect a $100,000 plant, 3000 barrels capacity at Fresno. A. M. Drew, Fresno, Walter Cameron, Hanford, and Empey Robertson, San Fran-

cisco, constitute a committee appointed to investigate various propositions.

Cracking Units

Indian Refining Company, Lawrenceville, Illinois, (The Texas Company) is building two new cracking units with rated capacity of 1500 barrels each, designed to operate on topped crude. The units are de Florez type, designed by The Texas Company. Indian Refining Company crude capacity is 16,000 barrels, and present construction will increase cracking capacity to 12,000 barrels.

Gasoline Plant

H. A. Bardeen, independent operator, has completed a 2000-gallon absorption plant in the Hopper Caynon district, to handle the gas from one well already completed and from wells to be completed this year. The plant was built so that additional units may be added and is of the semi-portable type. Ryan and Hackett built the plant.

Completing Plant

Creole Petroleum Company, at Carapito, Venezuela, South America, is scheduled to complete construction of its new refinery during May. This Standard Oil Company of New Jersey subsidiary will then begin supplying the bulk of the parent companies 750,000-barrel fuel oil contract to the Chilean government — initial shipments on this contract having been made from the Baton Rouge plant of Standard Oil Company of Louisiana.

▼ Operating ▼

Operating

Lisbon Gasoline Company's eight unit natural gasoline plant on the E. E. Morris farm, J. Cadena Survey, southern Joiner area, Rusk County, East Texas, has started operating, processing about 2,000,000 cubic feet of gas daily, and shipping gasoline from a loading rack on the I-G.N. Railroad at Poindexter Switch. General offices of the company are at Shreveport, Louisiana.

Completion

Mohawk Petroleum Company has completed construction of its Fruitvale, California, refinery and is to produce gasoline, Diesel engine oil and road oil. Capacity is reported at 2000 barrels per day. (Ref. & N.G.M.—April, 1932, page 76 A).

Operating

Orville Rinehart, C. L. Foster, and E. M. Wells, Osage, Wyoming field operators have formed a syndicate and are operating its new refinery at Hot

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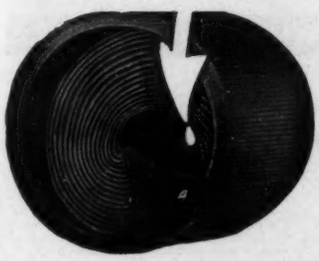

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Springs, South Dakota, (the first refinery in this state). The plant is located three miles southwest of the city, and operates on crude from the Osage pool.

Refinery

Seaside Oil Company has enlarged and remodeled its Ventura Avenue refinery to provide for the manufacture of asphalt. The asphalt plant was completed several months ago, this product formerly having been made at the Summerland plant.

Changes

Acquisition

Allube Corporation, a newly organized California concern, has acquired the plant, patented processes, equipment, distributing system and good will of Alloil Lubricants, Ltd., Glendale, California. The new company plans to enlarge the plant and expand operations in the near future. The company will produce, blend and distribute lubricants, both solid and semi-solid. Plant capacity is to be enlarged about 50 per cent.

Change Operators

Lubrite Refining Company of St. Louis, will take over the operation of the Wood River refinery owned by White Star Refining Company, as an additional development in the organization of middle west operations of Vacuum Oil Company, parent organization controlling Lubrite and White Star. All of the refining and marketing operations formerly engaged in by White Star will, in the future, be handled by the Lubrite organization. The White Star refinery, located 20 miles from St. Louis at Wood River, has a capacity of 5500 barrels per day.

Receivership

O'Bar Refinery, Coleman, Texas, is operating under receivership (O. A. Newman of Coleman, Texas, named receiver) as consequence of Attorney General Allred's action bringing suit for $4,145.20 due the state in gasoline taxes.

Discontinues

Standard Oil Company (Indiana) has announced that it will discontinue operating its Laramie, Wyoming, refinery and products formerly supplied by this old plant will be furnished by the Casper plants. Older employees were transferred to Casper.

Negotiations

Standard Oil Company of New Jersey has negotiations under way with Pan-American Petroleum & Transport Company involving the acquisition of the latter concern's foreign properties, involving a total of about $100,000,000 in cash and stock. Pan-American Petroleum & Transport Company, a subsidiary of Standard Oil Company (Indiana), is a large producer of Mexican and South American crude, operates a 115,000-barrel refinery at Aruba, Dutch West Indies, and has a marketing subsidiary in England.

The Elwerath, Wintershall, Preussag (Prussian State) combine has completed its refinery at Misburg, Hanover, Germany, and placed it in operation after trial runs. Recently, it is reported, Shell-Union and Standard Oil Company subsidiaries acquired one-third interest in this refinery.

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Fundamental Physical Data

Physical and Thermal Properties of Petroleum Distillates. W. H. BAHLKE AND W. B. KAY.. *Ind. Eng. Chem* **24** (1932) pp. 291-301.

This article contributes to the knowledge of the pressure-volume-temperature relationships in hydrocarbon systems. Data of the character given are of particular importance in the design of cracking plants. The work reported covers a study of a commercial gasoline and a naphtha of narrow boiling range. These products were chosen because they had nearly the same sp. gr., average molecular weight and average boiling point, but widely different boiling ranges. In addition to the P-V-T relationships over a wide range of conditions, the behavior of the materials in the critical region was carefully studied. Also, for the naphtha, the specific heats at constant pressure and constant volume, the Joule-Thompson coefficients, latent heat, and total heat were calculated. Methods of calculation are given in detail. The investigation showed that the P-V-T relationships of hydrocarbon solutions of several components are similar in all respects to those of binary solutions. The apparatus used is described and charts showing the results of experiment and calculation are included.

Chemical Composition and Reactions

Studies in the Olefin Series. I. Synthesis of Δ′ Olefins. R. WILKINSON. *J. Chem. Soc.* **196** (1931) pp. 3057-62.

The preparation of the Δ′ olefins from pentene to nonene is described and the properties of these substances given. The reaction used was that of the corresponding magnesium alkyl bromide on alkyl bromide and the separation of the olefin by formation of the dibromide followed by fractionation and regeneration of the hydrocarbon by use of zinc-copper couple in 90% ethyl alcohol. Among the olefins movement of the double bond toward the center of the chain increases density and boiling point. The iso-structure has the effect of lowering the b.p. 9°C.

Isolation and Determination of Methylcyclopentane in a Mid-Continent Petroleum. MILDRED M. HICKS-BRUN AND J. H. BRUUN. *Bur. Stand. Jour. Research* 7 (1931) pp. 799-809.

Oklahoma crude petroleum was fractionated into 1°C. cuts. The fractions between 68-78°C. were nitrated to remove benzene. Methylcyclopentane was then separated by a procedure involving equilibrium melting and also distillation after mixing with methylalcohol. The properties of the hydrocarbon were b.p. 71.8°C., m.p. —141.9° to —142.3°C., d_4^{20} 0.7487, n_d^{20} 1.4098, and critical solution temp. with aniline 34.7°C. The crude contained 0.2% of methylcyclopentane.

Cracking Ethylene and Paraffin Hydrocarbons. M. D. TILICHEEV AND A. L. FEIGIN. *Repts. Conf. on Cracking Hydrogenation Grozny,* **1** (1931) pp. 267-97.

Caprylene, hexadecylene, decane, dodecane, hexadecane, dotriacontane, 7.8-dimethyl-tetradecane, and branched normal hexadecanes were either synthesized or separated from petroleum fractions. The temperature of cracking was 425°C., and the time of cracking was varied. It was found that the mono-olefins cracked more readily than the paraffins although the difference was smaller the higher the molecular weight. The olefins form polymerization products that decompose. The paraffins crack to give paraffins and olefins. In destructive hydrogenation the olefins are hydrogenated to form paraffins.

Pyrolysis of Simple Paraffins to Produce Aromatic Oils. F. E. FREY AND H. J. HEPP. *Ind. Eng. Chem.* **24** 1932, pp. 282-8.

The results of a study of the thermal formation of aromatic hydrocarbons from methane, ethane, ethylene, propane, and butane are reported. Time and temperature were studied as variables and it was found that within the range of temperature 700°C. to 1050°C. the general course of the reactions was essentially the same, if appropriate reaction times were used. A rapid decomposition during which heat was absorbed and olefins formed was followed by a slower polymerization in which heat was evolved and aromatic hydrocarbons formed. The yield of benzene and toluene increased with the carbon-hydrogen ratio of the starting material. At 850°C. butadiene and cyclo-pentadiene were the principal low-boiling hydrocarbons formed aside from benzene and toluene. A bibliography is included.

The Composition of Tractor Fuel from Cracked Products. I. E. BESPOLOV. *Reports Conf. on Cracking Hydrogenation Grozny,* I (1931) pp. 304-22.

The chemical composition of gasoline produced by cracking is influenced by temperature and especially by pressure, but is little affected by re-cycling. Distillates from pipe-still units are higher in unsaturated compounds than those from shell stills. Gasolines made by low pressure vapor-phase cracking of residues are high in unsaturateds and aromatics. Three types of tractor fuels were finally developed:

	Heavy Fuel	Light Fuel	Pressure Dist. Fuel
	%	%	%
Unsaturated . . .	12	17	19
Aromatics . . .	22	18	15
Naphthenes . . .	38	27	24
Saturateds . . .	28	41	42

Manufacture-Processes and Plant

Measurement of the Flow of Gases and Vapors. B. F. DODGE. *Ind. Eng. Chem.* **24** (1932) pp. 261-73.

A review of methods and equipment for measuring the continuous flow of gases. Included are differential pressure meters of the orifice, Venturi, Pitot tube and Shunt meter types, volume displacement meters, calorimetric or thermal meters, turbine meters and anemometers, and miscellaneous meters or methods.

Tower Absorption Coefficients-IV. L. M. BENNETCH AND C. W. SIMMONS. *Ind. Eng. Chem* **24** (1932) pp. 301-3.

A general absorption equation is developed that is applicable to systems in which the solute follows Henry's or Raoult's law, the carrier gas is inert, and the absorbing medium non-volatile. For any given system the absorption coefficient is characteristic and substantially constant. Increase in the mole-flow ratio causes some increase in the absorption coefficient, occasioned by the decrease in free tower-volume.

Heat Transmission to Oil Flowing in Pipes. T. K. SHERWOOD, D. D. KILEY AND G. E. MANGSEN. *Ind. Eng. Chem.* **24** (1932) pp. 273-7.

A light asphalt-base oil was heated with steam in a double-pipe heater arranged for experimental purposes. Four different lengths of 0.593-inch I.D. copper tube were used. Oil inlet temperatures varied from 43°C. to 68°C. The steam temperature was 99-101°C. The linear velocity of the oil was varied from 0.71 ft. to 10.3 ft. per second. The corresponding oil-side film coefficients varied from 27 to 179 B.t.u. per hour per sq. ft. per 1°F. In the region of turbulent flow the data correlate fairly well, if plotted in the manner used by Morris and Whitman. This is not true in the region of viscous flow. However, in this region it was found that the data are

well correlated by the method of plotting used by Drew, Hogan, and McAdams, and based on the theoretical relationship of Groetz.

Corrosion of Cracking Equipment. I. E. BESPOLOV. *Repts. Conf. on Cracking Hydrogenation* I (1931) pp. 358-77.

Several metals and alloys were subjected to the action of hot cracked gasoline vapors and the decrease in weight determined. The order of ease of attack was lead, copper, Babbitt metal, cast iron, brass, tin, iron, and steel. Low boiling fractions attack lead rapidly. Copper is more readily attacked by heavier fractions. Liquid is less active than vapor in acting upon all the materials except copper.

Copper and lead are attacked by untreated cracked gasoline to a marked degree under conditions of storage. Refined cracked gasoline affected cast iron most seriously, then brass, aluminum, and copper.

On storing unrefined cracked gasoline with the several metals the following changes in the gasoline were noted: without any metal, a slight development of yellow color; with copper, a gradually increasing greenish coloration and separation of gum; with brass, same as copper but less marked; with lead, the gasoline brightened, acquired a slight greenish color and an ethereal odor; with cast iron, the gasoline turned yellow and much gum was deposited; other metals had little effect. Refined gasoline was similarly affected but to a much smaller extent. Sulfur was found not to affect stability.

Hydrogenation of Petroleums. A. N. SAKHANOV AND M. D. TILICHEEV. *Conf. on Cracking Hydrogenation Grozny* I (1931) pp. 147-208.

Decompositions and condensations similar to those observed in cracking are had in hydrogenation. The rate of the reactions of decomposition is doubled by a temperature rise of 10°C. In treating heavy oils the temperature of hydrogenation should not exceed 450°C., for above this temperature the reaction is reversed. The hydrogenation of heavy gas oils should be effected at a temperature below 425-450°F. and at a cold hydrogen pressure of 100-150 atm. or 250-350 atm. working pressure or above. The use of catalysts is required in hydrogenating heavy oils. Distillates and residues should be hydrogenated separately as the gasoline yield is only 45-50%, if they are treated together. A yield of 63-5% gasoline was obtained by hydrogenating Grozny mixed-base fuel oil and bottoms, using two recycling operations. A gasoline yield of 80% can be obtained by hydrogenating heavy gas oils and residues. The consumption of hydrogen per unit of gasoline formed is 5/100 in treating heavy residues and 3.7/100 in treating heavy gas oils. The gasoline made contains 5% aromatics, 10% unsaturateds, 26% naphthenes and 59% paraffins.

Acid and Vapor-Phase Methods of Refining Cracked Gasoline. I. BESPOLOV AND A. DUDENKO. *Azerbaid, Neft. Choz.* (1931) No. 5 pp. 70-4.

A fraction from cracked Baku gasoline, which boiled between 175-200°C., was treated by 10 minute agitation with 1, 3, 5, 10, and 30% of 93% sulfuric acid, followed in each instance with a water wash, neutralization, water wash, and rerun to 200°C. end-point. The initial Saybolt colors and the colors after one month standing in the dark were, respectively: 2,2; 16,12; 17,17; 15, less than —9; 17,3. The most stable product was that treated with 5% of acid, but it lost 15-20% of the aromatic substances originally contained. Fullers earth treatment in the vapor-phase gave a water-white product. The treatment recommended is combined acid and vapor-phase fullers earth.

Alcohol from Gases and Gasolines Produced by Cracking.. C. HOLZMAN. *Allgem. Oel. u. Fett-Ztg.* **28** (1931) pp. 245-8.

Gas from the "Carburol" system contained 13-15% propylene and other higher olefins. It was necessary to free the gas from sulfur, water, and gasoline before treating it with 90% sulfuric acid which was found to give the highest yield of alcohols. Isopropyl alcohol and an approx. 1:1 mixture of butyl and amyl alcohols were obtained. Alcohols required no special chemical treatment.

Products—Properties and Utilization

Ignition Quality of Fuels in Compression Ignition Engines. G. D. BOERLAGE AND J. J. BROEZE. *Engineering* **132** (1931) pp. 603-6, 687-89, 755-6.

A study of combustion and ignition phenomena, largely using a Thomassen 40 H.P. direct injection engine. Cetene and mesitylene are proposed as standards for matching fuels, but the investigation was confined to a gas oil and a coal tar oil. Knocking is shown to be more a function of ignition delay than of the fuel properties causing the delay. The authors conclude that engines should be designed to use a wide range of fuels rather than only a few fuels of the highest ignition qualities.

Carbureting Values of Gas Oils and a New Method for Their Evaluation. A. HOLMES. *Ind Eng. Chem.* **24** (1932) pp. 325-8.

The problem of the gas manufactures in securing suitable oils for carburetting blue gas has been complicated by the fact that the paraffinic gas oils, which are best for the purpose, have also been in demand for cracking. The criteria by which gas oils have been judged, and on which specifications have been based, include gravity, boiling range, sulfur content, carbon %, and some others of less importance. Specifications are such that good oils are frequently excluded and poor oils sometimes included. Analysis for classes of chemical individuals is more reliable but is time-consuming. Actual use in laboratory of small scale gas enrichment is reliable but expensive and time-consuming. A rapid method is proposed that checks the chemical analysis and carburetting test methods closely. This method is based on determination of specific gravity "d," average boiling point "T," and light dispersion "H," as combined into a relationship $y = T(1-d)\,d / H$, in which y is a number that is a function of the number of gallons of oil required per 1000 cu. ft. of enriched gas of 530 B.t.u. per cu. ft. produced when using a 300 B.t.u. blue gas. Values of "y" plotted against "G" on log-log paper fall on a straight line. "G" is the gallons of oil as just stated.

Variation of Melting Points of Mineral Oils Accompanying Changes of State. P. WOOG, E. GANSTER AND F. COULON. *Compt. rend.* **193** (1931) pp. 850-2.

The rate of cooling and the time the oil is held at the low temperature (—85°C.) affect the melting point of asphaltic and naphthenic mineral oils. The slower the rate of cooling and the longer the time of congelation, the more nearly constant the melting point. Rapid cooling results in a vitreous or amorphous solid, that melts

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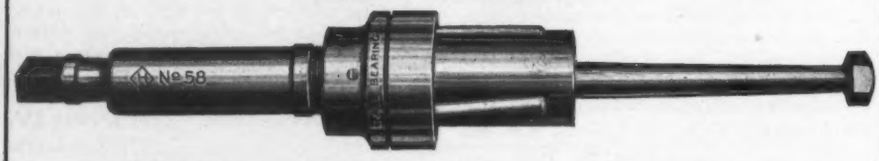

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Temperature — Viscosity Factor of Lubricating Oils. A. KARASEVA AND S. OBRYADCHIKOV. *Groznenskii Neftyanik* I (1931) No. 8-10, 92-5.

The chemical composition of lubricating oils affects the rate of change of viscosity with temperature. Oils that are heated to a high temperature in the course of manufacture are changed chemically in such manner as adversely to affect the temperature-viscosity factor.

Estimation of Softening Point as Factory Guide in the Evaluation of Paraffin. C. DAVISON AND S. V. PILAT. *Allgem. Oel. u. Fett-Ztg.* **28** (1931) pp. 261-3.

The ball-and-ring apparatus, standard in asphalt testing, is used to determine the softening point. The rings are filled 3-4°C. above the solidification point, the excess wax cut off after 20 min. standing at room temp., the balls put in place, and the whole assembly kept in water for 30 min. at room temperature. The temperature is then raised 1°C. per minute. The temperature at which the cylinder of wax is forced from the ring is the softening point. Determinations can be checked to within 0.2 to 0.4°C. The less the difference between the softening and solidification points the better the paraffin.

Notes on the Ball and Ring Method. FRED C. EATON. *J. Rheol.* **2** (1931) pp. 392-4.

The vaporization of volatile components of the sample can markedly affect the softening point of bituminous materials. The softening point is also affected by the rate of rise of temperature even if this is within the specified limits. A correction for this can be applied. It is suggested that the measurement of fluidity would serve to better advantage as a criterion of the nature of the material than the softening point.

Determination of Mean Molecular Weight of Lubricating Oils by Improved Cryscopic Methods. N. G. GULLICK. *Jour Inst. Petr. Tech.* **17** (1931) pp. 541-71.

Molecular weights of five lubricating oils from Venezuela crude and three from Pennsylvania crude were determined cryoscopically to an accuracy of ± 1.5 per cent. Nitrobenzine was not satisfactory as a solvent for it precipitated the heaviest fractions. Benzene with sodium sulfate added as dehydrating agent proved satisfactory. Sp. gr., refractive index, log. viscosity, absolute viscosity, and flash points of Pennsylvania oils are directly proportioned to molecular weight. The values of the properties of the Venezuelan oils increase with mol. wt. but the relationships are not linear.

Estimation of Paraffin Wax. H. J. TORMEY. *Chem. Analyst.* **20** (1931) p. 15.

3-5 g. of the petroleum product are dissolved in a mixture of abs. alcohol and ether and cooled to —20°C. The deposited paraffin is separated by use of a suction filter and is washed with the alcohol-ether mixture. It is then dissolved in hot benzene, separated from the benzene by evaporation of the latter, and weighed.

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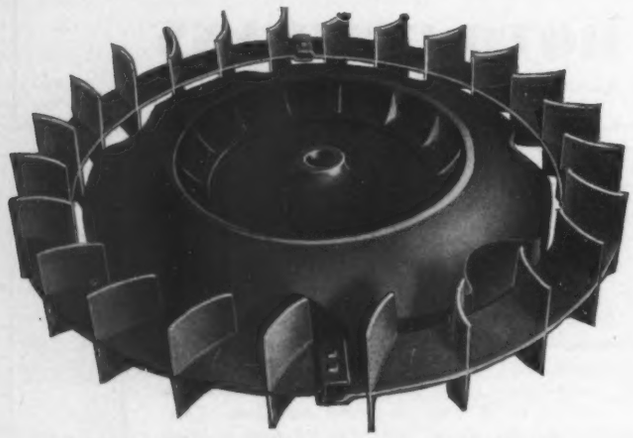

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The construction of Coen Duplex Strainers is as careful as their design is compact. They are furnished in bronze in sizes from 1/2" up, tested to 500 lbs., also in cast iron from 1 1/2" up, tested to 150 lbs. Sizes larger than 6" to order.

Write for Bulletin 14R.

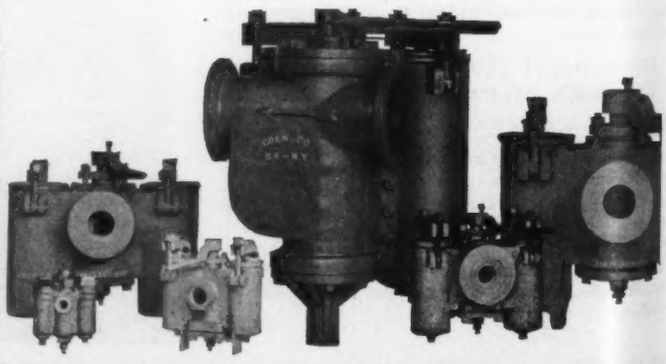
Coen Products include: Mechanical Oil Burners; Air, Steam or Gas Atomizing Oil Burners; Tri-fuel Burners; Registers; Oil Heaters (steel cleanable); Oil Fuel Pump Sets; Oil Burning Accessories. . . . . .

COEN COMPANY INC.
COMBUSTION ENGINEERS

Manufacturers of Fuel Burning Systems

610 SOUTH BROADWAY, LOS ANGELES, CALIF.

915 Bryant Street, SAN FRANCISCO — 1st Dispatch Building, HOUSTON — 30 Vesey Street, NEW YORK



New Equipment for the Modern Plant

1. Volatile Liquid Pumps

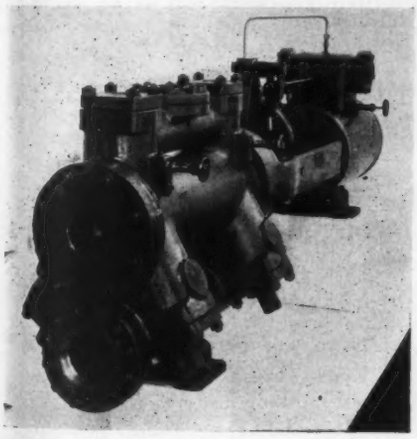
WORTHINGTON PUMP AND MACHINERY CORPORATION

The refiner, in operating vapor recovery systems and natural gasoline and stabilizing plants, encounters many "wild" fractions—butanes and propanes—which are liquid under pressure but which revert to gases when the pressure is decreased. The highly volatile nature of these "wild" fractions presents a problem both to the user and the manufacturer of pumps.

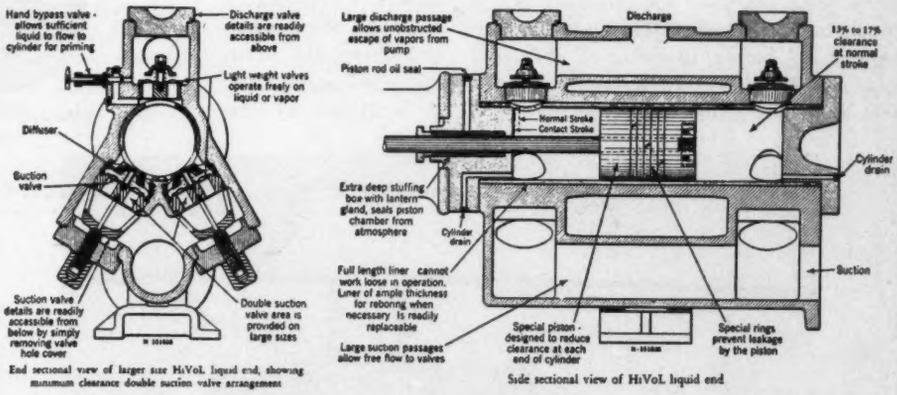
As a result, a demand arose for a reciprocating pump embodying the high volumetric efficiencies of gas compressors whose volumetric clearances average only seven to eight per cent. However, these extremely low volumetric clearances cannot be secured in a direct acting pump which must have large valve areas to avoid the high velocities permissible in compressor design.

In designing the HiVol pump, engineers of Worthington Pump and Machinery Corporation placed the suction and discharge valves at the extreme end of the liquid cylinder—the suction valves below, and the discharge valve above, the piston on the vertical center line of the cylinder. In the smaller sizes, there is one suction valve located at an angle of approximately 30 degrees with the vertical center line of the pump. On the larger sizes there are two suction valves, one on either side of the vertical center line of the cylinder and at angles of about 30 degrees to it. This design accomplishes three things: A straight-line flow of liquid through the cylinder; maximum suction valve area; and minimum volumetric clearance.

These important considerations cannot be realized in the conventional side pot design where the suction valves are located on the sides of the liquid cylinder. As a result, there is considerable agitation of the liquid in the cylinder and a consequent release of a large volume of gas. Volumetric clearance also is greater, both because the suction valve must be offset beyond the cylinder barrel to avoid gas pockets (and to permit sufficient metal between the valve seat and the cylinder wall), and because of the increased volume between the top of the charge valve. This explains why it is possible to attain volumetric clearances of 12 to 17 per cent in the HiVol pump compared with 65 to 90 per cent in the side pot type.



Worthington HiVol Steam-Driven Refinery Pump


Hand bypass valve - allows sufficient liquid to flow to cylinder for priming
Discharge valve details are readily accessible from above
Light weight valves operate freely on liquid or vapor
Diffuser
Suction valve
Suction valve details are readily accessible from below by simply removing valve hole cover
Double suction valve area is provided on large sizes
End sectional view of larger size HiVoL liquid end, showing minimum clearance double suction valve arrangement
Large discharge passage allows unobstructed escape of vapors from pump
Discharge
13% to 17% clearance at normal stroke
Piston rod oil seal
Normal Stroke
Contact Stroke
Cylinder drain
Extra deep stuffing box with lantern gland, seals piston chamber from atmosphere
Cylinder drain
Full length liner cannot work loose in operation. Liner of ample thickness for reboring when necessary is readily replaceable
Suction
Large suction passages allow free flow to valves
Special piston - designed to reduce clearance at each end of cylinder
Special rings prevent leakage by the piston
Side sectional view of HiVoL liquid end

Cross Section of Worthington HiVol Steam-Driven Refinery Pump

2. Gasoline Driven Arc Welder

HOBART BROTHERS COMPANY

Hobart Brothers Company, Troy, Ohio, has placed on the market a new six-cylinder, self-starting gasoline engine drive arc welder with a service rating of 400 amperes at 40 volts, for oil field use.

It is built in a single unit with a heavy duty industrial engine, rated at 66 horsepower at 1500 r.p.m., and is equipped with a special super-cooling system. The engine has two gasoline saving points, each of which may be used by the operator at will, depending upon the type of work being done. The Hobart "varispeed" regulator permits governing the engine down to lower continuous speed when operating at lower welding rates. The machine is also equipped with an electric idling device which can be cut in or out as desired. When in use it allows 12 to 15 seconds for changing electrodes and if the arc is broken for longer periods it automatically slows the engine down to idling speed, bringing it up to full governed speed again instantly when the arc is restruck.

The new diverter pole type of generator is embodied in this machine, together with the triple range, "Unitcol" dial and navy type, twin-coil laminated core, reactance. The Hobart four-pole,

— — — — — — — — **MAIL COUPON** — — — — — — — —

REFINER AND NATURAL GASOLINE MANUFACTURER,
Houston, Texas, U. S. A.

Please see that I am supplied, without obligation, additional information on New Equipment Items Nos.....described in May 1932, issue of REFINER.

Name.....

Company.....

Address .....

four-brush, in-built exciter is used instead of separately mounted exciters of the two-brush design.

The Hobart Welder is also available in the electric motor driven type.

3. Adjustable Mercury Contact Thermometer

HIERGESELL BROTHERS

Hiergesell Brothers, 2518 Broad Street, Philadelphia, announces the new adjustable mercury contact thermoregulator, which controls between 0 and 300° F., and which operates on 110 volts A.C. 60 cycles, and carries from 4½ to 7½ amps.

Although entirely closed it is easily adjusted by heating and cooling the bulb. For example, if it is desired to control at a higher temperature, the bulb is heated until the temperature corresponds with that of the standard thermometer. The excess mercury is drawn out of the storage chamber at the top. The less mercury in the bulb at the bottom, the higher the control temperature. When desiring to control at a lower temperature the bulb is cooled down and the mercury which is in the storage chamber in the top is taken back into the column by inverting the regulator until the tip is inserted in the mercury in the storage chamber.

This apparatus is designed to control within the limits of 0.1° F. and the control point is reached almost instantaneously. The length of the standard morel regulator is 10 inches, the length of the bulb is 3¾ inches, diameter of the bulb is 15/32 inch and diameter of the reservoir at the top is five-eighths inch.

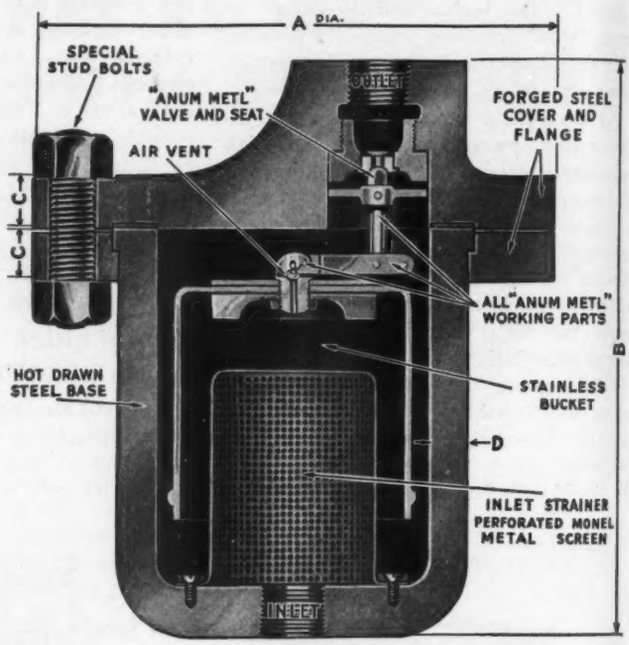
4. Inverted Bucket Steam Traps

THE STRONG, CARLISLE & HAMMOND COMPANY

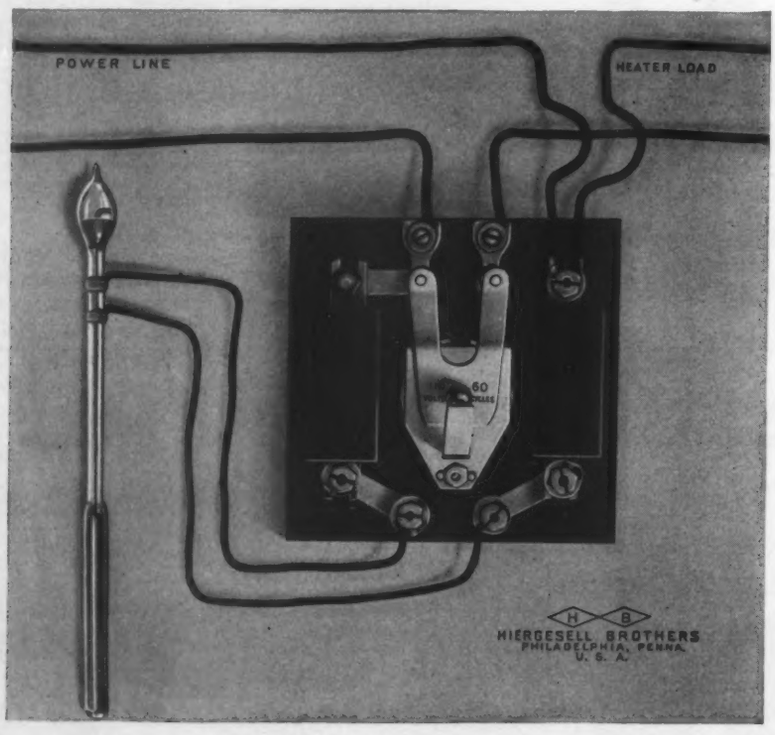
The Strong, Carlisle & Hammond Company, Cleveland, Ohio, announces two outstanding, patented improvements to the present line of inverted bucket steam traps.

The anti-balancing device is used on all sizes of Strong inverted bucket traps, with exception of the No. 70 and the No. 71. This device consists of a valve arrangement in the lever, which replaces the conventional air vent in the bucket. This valve is arranged with a small opening at all times to allow the air and gases to escape from the bucket while the trap is filling. When the trap reaches the point of discharge, where balancing usually occurs, the larger valve is automatically opened, allowing a quantity of air to escape suddenly from the bucket and sufficient water to enter the bucket. This overbalances the bucket and opens the main trap discharge valve. It is stated by the manufacturers that this device partially eliminates the tendency to balance, or what is usually known as "dribbling," commonly found in inverted bucket traps.

The Strong inverted bucket forged steel trap is also fitted with the anti-balancing device. In addition to this device, these traps are furnished with patented internal Monel strainers which eliminate the extra joints required incidental to installing external sediment strainers ahead of high pressure traps. These traps are furnished with stainless buckets, Anum-Metl seats and discs as well as all operating mechanism and are built for pressures up to 1800 pounds.



Strong, Carlisle & Hammond Steam Trap



Hiergesell Thermo-Regulator

5. Welding Wire Feeder

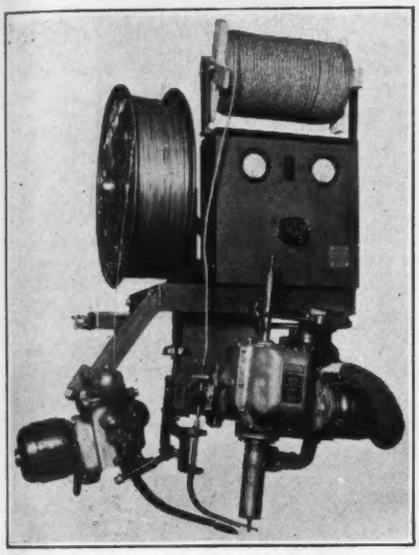
LINCOLN ELECTRIC COMPANY

Lincoln Electric Company, Cleveland, Ohio, announces a new automatic welding head which feeds filler metal into a shielded arc. It is designed for high speed operation on either butt, filler or building up welding.

The shielded arc technique is secured through the use of the Electronic Tornado welding head and a fibrous autogenizer which is fed into the arc flame. The autogenizer burns and forms a gas excluding the oxygen and nitrogen of the atmosphere while the metal is molten. The welding head utilizes a carbon arc around which is superimposed a magnetic field which directs the arc stream on the line of fusion.

Full automatic control of the arc is said to be obtained, thus maintaining the heat of the arc constant. Means are also provided for varying speed of the travel of the head through a wide range. Continuous filler metal is obtained from a reel mounted on the head and fed into the arc just in front of the

arc travel. Means are provided for varying the rate at which the filler metal is fed into the arc so that the amount of metal deposited can be varied to meet the conditions demanded by the speed of the head and the type of weld being made. Since the rate at which the filler can be fed is varied independent of the speed of the head travel, only one size of filler metal is necessary for any type of work within the range of the machine.



Lincoln Welding Wire Feeder

The filler metal is commonly in strip form which provides accuracy in feeding the metal in the arc. Factors determining the most desirable size and form of the filler metal are ease of handling, compactness of the coils and minimum disturbance of the arc.

The filler metal is described as carrying no current and its size is independent of the current used for welding. One size of strip can be used for any current from 75 to 500 amperes. The filler strip does not pass through the arc as in metallic welding, but beneath it, and is therefore not subject to extremely high temperature of the arc stream.

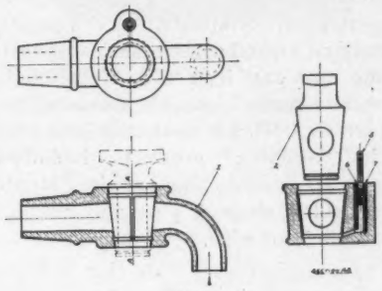
Since the welds are made in a shielded arc, the physical characteristics are similar to those obtained by other shielded arc methods. It is claimed a tensile strength ranging from 65,000 to 80,000 pounds per square inch is obtained, with a ductility of 20 per cent or more elongation in 2-inch.

The manufacturer states that the range of applications of this type of automatic covers practically all fields where arc welding is applicable.

6. Lubricated Valves

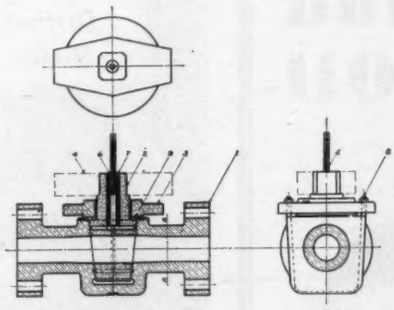
THE U. S. STONEWARE COMPANY

The U. S. Stoneware Co. of Akron, Ohio, has recently brought out two types of lubricated chemical stoneware valves. These are known as Figure 542 and Figure 543, and are shown in the accompanying cuts. Both types are offered in all size bores up to and inclusive of 6-inch. Both designs may be supplied with any type of pipe connection, that is, with flanges for bolted connection, conical or ball flange connections, threaded or ground shank connections, long or short bibbs.



542

The figure 542 type is designed to meet those applications where a low cost valve with a reasonably efficient lubricating system is desired. This type completely obviates the difficulty of sticking and it is possible to lift the plug of the valve from its seat.



543

The Figure 543 type is a perfected lubricated valve. All surfaces of the plug are well lubricated and all seats have a thorough grease seal. The lubrication is arranged so that a minimum of lubricant finds its way into the liquid passage.

ENGINEER. Five years industrial plant; past seven years with engineering contracting organization oil refining equipment. Experience covers design, operation, cracking units, pipe stills, vacuum equipment, auxilliaries. Desire connection with contractor, refiner or equipment sales. Prefer east. Address Box 980, care Refiner & Natural Gasoline Manufacturer, Houston, Texas.

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See Telephone book for Representatives

This is the patented Campbell Regulating Element. No moving parts. No floats. No thermostats. No generators.

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is unquestionably in a class by itself. That is why more refineries are adopting it. Wouldn't you like to have complete information?

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State.....

7. Safety Hand Lamp

MINE SAFETY APPLIANCES CO.

Mine Safety Appliances Company, Braddock, Thomas and Meade Streets, Pittsburgh, announces another safety electric hand lamp in two models, H and K, each of which has been officially approved by the U. S. Bureau of Mines. Model K is shown here.

Handy Lamp

This handy lamp is made particularly to permit safety in gaseous and dust laden atmospheres. It consists of standard Edison Model H and Model K nickel-iron alkaline mine lamp batteries, respectively, each with magnetically locked, detachable cover. The head piece is fabricated from Bakelite and may be equipped with either polished or matte surfaced reflector. The two-filament gas-filled bulb is operated by a switch on the head piece. When equipped with polished reflectors, these lamps may be used as spotlights, developing 350 to 600 beam candle power, respectively. Where a spread of light is required, the matte reflector is recommended.

8. Cast Iron "Zee Metal" Bolt

AMERICAN CAST IRON PIPE CO.

American Cast Iron Pipe Company, Birmingham, Alabama, has recently completed an exhaustive series of tests of the new cast iron "Zee-Metal" bolt, a product made to enable the company to furnish a 100 per cent cast iron joint in its "Simplex" products, including Mono-cast doublex simplex pipe, Monoloy doublex simplex pipe and simplex prepared joint pipe.

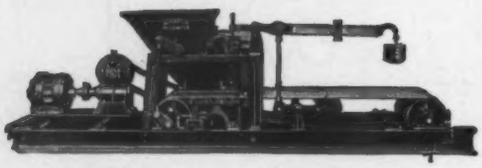
The manufacturers state that in these tests the cast iron "Zee-Metal" bolts developed a minimum ultimate tensile strength of 75,000 pounds per square inch without displaying a tendency to stretch or strip the threads.

American Cast Iron Bolt

This new bolt combines the corrosion resistance of true grey cast iron with fine physical properties. The bolt has been made specifically to broaden the use of cast iron pipe.

Detailed information on the bolt is available upon request.

If You Treat Ten Thousand Barrels of Oil



The Automatic—Feeder Weigher—Conveyor

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Afford wearer Complete Protection in Poisonous Gases and Oxygen Deficient Atmospheres. Widely used for entering and working in Tank Cars, Oil Tanks, Shipholds, Gas Holders, Sewers, Etc.

Bulletin No. 66 Gives Complete Information
SEND FOR COPIES

Mine Safety Appliances Co.
Braddock, Thomas and Meade Sts., Pittsburgh, Pa.

"EVERYTHING FOR MINE AND INDUSTRIAL SAFETY"

ITEMS ABOUT MANUFACTURERS

Alco Products, Incorporated, New York, has opened a new branch office in the Rialto Building, San Francisco. This office is under the charge of R. S. Danforth, whose territory includes all of California.

The Kron Company, Bridgeport, Connecticut, formerly American Kron Scale Company of New York, has recently appointed George A. Nichols as New York district manager. He will be located at 801 Chrysler Building. Nichols formerly was district manager for Wright Manufacturing Company. The management of the Kron Company states that the company is now building a world-wide sales organization for the distribution of its industrial scales.

Geo. P. Reintjes Company, Kansas City, Missouri, is issuing a series of brochures to the industrial trade covering various phases of brick work construction, including refinery plant installation. A set of these brochures is available for the asking.

LOUIS H. BRENDEL

Mason Regulator Company's advertising department is now in charge of Louis H. Brendel, formerly advertising manager of Neilan Company, Ltd., in Los Angeles. Brendel was transferred to Boston early this year, following acquisition of Neilan Company, Ltd., by Mason Regulator Company. In his position of advertising manager for Mason Regulator Company he is also in charge of the Neilan division advertising.

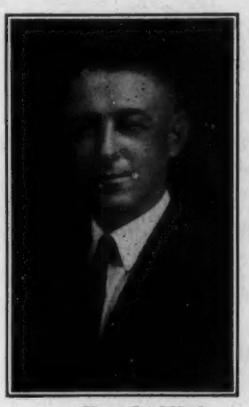
B. W. VINSON

B. W. Vinson Company, Incorporated, is the new name under which Bailey W. Vinson will continue operation of the business formerly known as Vinson-Canter Company, at Tulsa. The new firm will continue to act as manufacturers' representative in the Mid-Continent for refinery and gasoline plant and other industrial equipment. Mr. Vinson has been identified with the sale of industrial equipment in the Mid-Continent for the last ten years, the last three of which he has operated through Vinson-Canter Company. Among other lines, the company will represent Ohio Steel Foundry Company, Northern Equipment Company, Duncan Foundry & Machine Company and American Arch Company.

At a recent directors' meeting of the Roessler & Hasslacher Chemical Company, in New York, Dr. H. R. Carveth, president of the company, announced his retirement as president and director of the company and as a director of E. I. du Pont de Nemours & Company, of which R. & H. is a subsidiary. Dr. M. J. Brown, vice-president and a director of R. & H. also resigned all positions with the company. Charles K. Davis of New York was elected president to succeed Dr. Carveth. He will also be general manager. Dr. E. A. Rykenboer, formerly vice president will be vice-president and assistant general manager. The other officers are: Chairman of the board, W. F. Harrington; vice-president and secretary, Colby Dill; vice-president, Milton Kutz; treasurer, Albert Frankel; assistant treasurer, August Heuser; assistant secretary, M. D. Fisher; assistant secretary, E. A. Howard; assistant secretary, J. Carlisle Swaim.

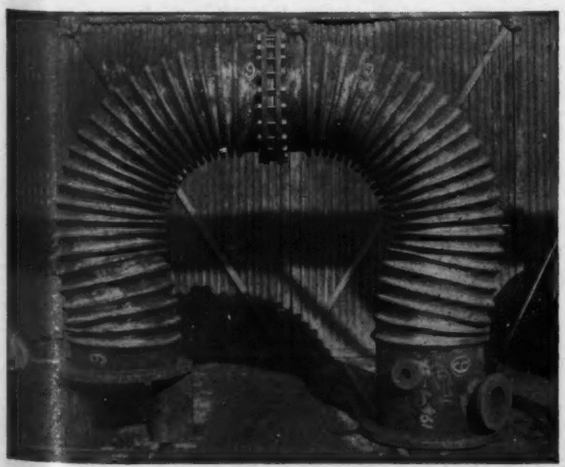
Neilan Company, Ltd. of Los Angeles announces the appointment of M. N. Aitken as sales engineer in charge of sales of Neilan equipment to the natural and manufactured gas industries exclusively. The recently perfected line of Neilan rate-of-flow controllers and flow meters rounds out the established line of Neilan regulators for the gas industry.

Lincoln Electric Company, Cleveland, Ohio, has appointed La Consolidada, S. A. of Mexico, D. F., as Mexican distributors of Lincoln welding products. This Mexican company is one of the largest steel manufacturers in Mexico, and was established in 1900 as a branch of the Issac Joseph Iron Company of Cincinnati. The present company was established in 1907.



WALTER PARKER

Pittsburgh Equitable Meter Company announces the appointment of Walter Parker as chief engineer, Liquid Meter Division. Previous to his association with this company, where he has been doing special engineering work, Parker was chief engineer of Fry Pump Company. His experience in designing and building meters and allied equipment for the petroleum industry covers many years. He is a graduate in mechanical engineering of North Carolina State University.



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CATALOGS . . . BULLETINS

Helpful Publications Which Manufacturers Will Be Glad to Send Free for the Asking

Steam Trap

McAuley Automatic Trap Company, Imperial Power Building, Pittsburgh, Pennsylvania, is distributing an interesting booklet dealing with steam traps, their construction, installation, operation, and maintenance. The well illustrated booklet presents drawings of proper hook-ups, engineering data useful to the problem, and prices.

Alloy

Burgess-Parr Company, Moline, Illinois, has ready for distribution an illustrated booklet dealing with Illium, a new non-ferrous alloy. The metal, originally used and since 1916 for scientific apparatus, is traced in its history to its present commercial applicability. Physical characteristics, resistance to corrosion, constituents, properties, are discussed.

Pressure Regulators

The Strong Carlisle & Hammond Company, 1392 West Third St., Cleveland, Ohio, is distributing a new bulletin, No. 151, in which the company describes construction and working features of four types of regulating and reducing valves.

Water Level Recorders

The Bailey Meter Company, Cleveland, Ohio, in its new Bulletin, No. 112, describes its line of Bailey Boiler Water Level Recorders, giving details as to construction, operation and installation. Special types of recorders are discussed. Drawings illustrate manner of installations of various types.

Steam Traps

Bundy Steam Trap Company, Nashua, New Hampshire, is distributing to engineers and others interested, booklets dealing with its thermostatic traps, non-air binding inverted bucket steam traps, and its pumping traps—each bulletin giving installation illustrations and specifications.

Instruments

Hoskins Manufacturing Company, 4445 Lawton Avenue, Detroit, Michigan, in its catalog No. 53 describes its line of portable electric pyrometers, meters, automatic temperature controllers, thermo-couples, electric laboratory furnaces and other laboratory devices and commercial electric furnaces.

Copper Tube Fittings

Parker Appliance Company, 10320 Berea Road, Cleveland, Ohio, recently published bulletin No. 39, describing a new line of innerseal fittings for connecting copper tubes to male and female iron fittings. The bulletin describes also the innovation in plumbing introduced by the innerseal type of fitting.

Cork Insulating

L. Mundet & Son, Incorporated, 461 Eighth Avenue, New York, recently issued a catalog titled "Jointite Cork Products" which is sort of a compendium of information on the uses of cork for insulation purposes and which includes data, specifications, tables and charts for refrigeration, sound-proofing, heat prevention, heat conservation, vibration deadening, and condensation prevention.

Motors

Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, Missouri, has issued Bulletin 167, Part 7, a loose-leaf bulletin on polyphase squirrel-cage motors.

Ball Bearings

Gurney Ball Bearing Division of Marlin Rockwell Corporation, Jamestown, New York, has released for distribution the third edition of the Ball Bearing Manual giving engineering data, description and prices on single row bearings, thrust bearings, radio-thrust bearings, duplex bearings, double row bearings, lubriseal bearings, and miscellaneous bearings.

Holders

Pittsburgh-Des Moines Steel Company, 3492 Neville Island, Pittsburgh, Pennsylvania, has released for distribution a bulletin titled "Pressure Holders for the Oil and Gas Industry" which describes cylindrical holders, sphere holders, vertical oil storage and gasoline storage tanks.

Motor Generators

Elliott Company, Jeanette, Pennsylvania, has issued Bulletin 0-1 on motor-generators. The bulletin gives the reasons back of the popularity of the motor-generator, with the background of Elliott motor-generator units, the use of balanced design, synchronous motors, compensated generators, and the like.

Cast Iron Pipe

American Cast Iron Pipe Company, Birmingham, Alabama, announces publication of a 48-page booklet, carrying specifications for ACIPCO mono-cast centrifugal pipe, bell and spigot, and fully illustrating the information with actual working scenes.

Stainless Steel

Associated Alloy Steel Company, Inc., Union Trust Building, Cleveland, has a 24-page booklet recently off the press which tells the story of Nevastain Superalloy. Illustrations throughout the booklet show many of the varied uses of this product in finished articles.

Cast Iron Pipe—Fittings

The Central Foundry Company, Graybar Building, New York City, announces publication of a six-page color folder featuring the Universal Dual-Lok joint, cast iron pipe and fittings, designed for double safety against leakage. Complete information from the standpoint of design and construction is carried, and actual working photographs are shown throughout.

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(Address manufacturer direct)

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Gentlemen:

Please send to me, without obligation, free booklet described in the May issue of REFINER AND NATURAL GASOLINE MANUFACTURER.

NAME .....

COMPANY .....

ADDRESS .....

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of The Refiner and Natural Gasoline Manufacturer, published monthly at Houston, Texas, for April 1, 1932.

State of Texas, County of Harris: ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared A. L. Burns, who, having been duly sworn according to law, deposes and says that he is the Business Manager of The Refiner and Natural Gasoline Manufacturer and the the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: R. L. Dudley, 3238 Huntington Drive, Houston, Texas.

Editorial Director: S. W. Robinson, 5002 Scotland, Houston, Texas.

Editor: Grady Triplett, 2202 Dunston Road, Houston, Texas.

Managing Editor: J. Kent Ridley, 4401 Greely, Houston, Texas.

Business Manager: A. L. Burns, 4311 San Jacinto, Houston, Texas.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

The Gulf Publishing Company, Houston, Texas; James Anderson, Houston, Texas; R. L. Blaffer, Houston, Texas; Mrs. Sarah Campbell Blaffer, Houston, Texas; A. L. Burns, Houston, Texas; J. F. Carter, Jr., Tulsa, Oklahoma; Dr. N. L. Dudley, Goose Creek, Texas; R. L. Dudley, Houston, Texas; W. S. Farish, Houston, Texas; Wm. V. Gross, Houston, Texas; Howard R. Hughes, Houston, Texas; Chas. H. Lane, Houston, Texas; Wallace E. Pratt, Houston, Texas; J. Kent Ridley, Houston, Texas; S. W. Robinson, Houston, Texas; R. S. Sterling, Houston, Texas; R. F. Swinsky, New York, N. Y.; O. R. Waller, Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

A. L. BURNS,
Business Manager.

Sworn to and subscribed before me this 1st day of April, 1932.
(Seal)

J. KENT RIDLEY.
(My commission expires June 30, 1933.)

THE MONTH IN REVIEW

A. P. I. Mid-Year Session Turned to Economic Topics

THE Mid - year meeting of the American Petroleum Institute at Tulsa, June 1, 2, 3, scheduled to devote its sessions in all three divisions of the institute to both technical and economic problems of the industry became quickly involved in discussions of economics as the major consideration.

Following the presentation of the statistical surveys and economic forecast of the refining situation by the Voluntary Economics Committee of the Federal Oil Conservation Board and the institute's own Committee on Refinery Statistics and Economics, which two bodies estimated domestic gasoline decrease in the order of 6 per cent and 5.4 per cent, the institute board of directors elected to disagree with the statisticians and themselves forecast a decrease in gasoline consumption of around 15 per cent. Although the economists vigorously defended their calculations and forecasts, when word of the disagreement was announced, followed by discussions and challenges in practically every informal and official gathering, the ultimate result was to cast a decided gloom over what had started as an optimistic gathering.

The Division of Refining devoted its three sessions to the subjects of utilization of petroleum gases, motor fuels, and general refining topics. Eleven technical papers were presented at these sessions embracing studies of refinery operation problems, problems of free wheeling lubricants, friction testing methods for lubricants, new fields for the utilization of fuel oil, economic and technical problems of the liquefied gas industry, reforming of gaseous hydrocarbons, gas cracking and reforming processes; also the highly important work of Dr. Brown relating to the design of vapor recovery and rectifying units (previously reported before the American Chemical Society and the Natural Gasoline Association of America).

Vigorous discussion followed the presentation of the report of the Detonation sub-committee of the Cooperative Fuel Research Committee, which outlined the differences existing between laboratory anti-knock determinations and road tests. It was decided that the committee would make further studies and experiments before any attempt would be made to change the testing procedure previously tentatively agreed upon, and that the matter would be again submitted for consideration at the annual meeting at Houston in November. The discussion of the report was presented by Drs. Becker of the Standard Oil Company of New Jersey, Phillips of Sinclair Refining Company, Edgar of Ethyl Gasoline Corporation, Hill of Atlantic Refining Company, Barnard of Standard Oil Company (Indiana), Wagner of Pure Oil Company, Brandt of Cities Service Oil Company, Kremser of Standard Oil Company of California, Hubner of Universal Oil Products Company, Rather of Standard Oil Company of New York, MacKensie of The Texas Company, Stuart of Vacuum Oil Company, Clayden of Sun Oil Company and Walter Miller of Continental Oil Company—practically all of whom expressed opinions against any present modification or change in the C. F. R. testing procedure.

Economists Forecast Drop In Gasoline Demand

A SURVEY of probable gasoline demand for the last nine months of 1932, conducted by the economic committees of both the American Petroleum Institute and the Federal Oil Conservation Board, shows that the petroleum industry faces a drop in domestic gasoline consumption of at least six per cent during this period. Export of gasoline is expected to show a decline under the same period of last year of from 12 to 14 per cent. With total gasoline demand for the first quarter of this year showing an actual decrease of 3.8 per cent, it is probable that the net loss for the year will amount to about five per cent. Moreover, individual opinions by leaders of the industry indicate a probable loss in this branch of the industry's business of as much as 15 per cent.

Following are some of the more important figures revealed by the forecasts of both committees, which were presented for discussion at the Mid-year meeting of The American Petroleum Institute:

Forecast for last nine months of 1932	American Petroleum Institute Committee	Federal Oil Conservation Board Committee
GASOLINE		
Total demand (barrels)	335,500,000	337,000,000
Decrease under last year	6.6%	6.2%
Domestic demand (barrels)	305,500,000	307,500,000
Decrease under last year	6.0%	5.4%
Exports (barrels)	30,000,000	29,500,000
Decrease under last year	12.5%	14.1%
Suggested Stocks:		
April 1 (actual)	66,950,000	66,950,000
June 30	59,655,000	59,450,000
September 30	45,280,000	44,950,000
December 31	47,435,000	48,500,000
CRUDE OIL		
Demand:		
Runs to stills (barrels)	615,881,000	622,000,000
Exports (barrels)	20,000,000	20,500,000
Used as such (barrels)	10,000,000	10,000,000
Supply:		
U. S. Production (barrels)	618,381,000	611,875,000
Imports (barrels)	32,000,000	33,650,000
Drawn from storage (barrels)	(Incl. in Prod.)	6,975,000
Daily production required (barrels)	2,248,700	2,225,000

Natural Gasoline Men Moved Over Consumption

ECONOMIC subjects held the forefront of the program for the eleventh annual meeting of the Natural Gasoline Association of America, held in Tulsa, May 19, 20 and 21. With refiners taking smaller quantities of natural gasoline each month, the question before the body was that of finding a solution for a diminishing demand.

Following the session a committee set to work in an effort to find its relief through the larger refining companies. Some success marked its efforts with indications that some natural gasoline will be moved through the larger trunk line systems with crude oil.

The paper, "Economics of the Natural Gasoline Industry," by R. C. Alden, Phillips Petroleum Company, was the high spot on the program and most of the economic considerations came out of the discussions that followed this paper.

Many opinions were that natural gasoline output will continue to decrease because of the restricted use by refiners. This, however, was not ac-

cepted in all cases. F. L. Chase, Lone Star Gas Company, pointed out that conservation measures of the oil producing states will require that gasoline be extracted from natural gas.

F. E. Rice, Phillips Petroleum Company, agreed with Mr. Chase, except that he considered it likely that natural gasoline output will decrease for a year or two before the curve turns upward. Necessity for removing gasoline at stations along big natural gas lines and state laws were his reasons for expecting a future increase in output.

Double transportation costs had much consideration. The necessity for shipping natural gasoline from plants to refineries and then to bulk plants in motor fuel places natural gasoline at a disadvantage. Several concerns reported successful blending of refinery gasoline and natural gasoline at bulk plants, thus removing one shipment of the product.

The annual meeting got under way the afternoon of May 17 with the annual address of S. S. Smith, president. Committee reports followed. After these Dr. G. G. Brown of the University of Michigan presented his paper, "Properties of Hydrocarbons and High Pressures as Applied to the Design of Absorbers, Strippers and Stabilizers." Emby Kaye next presented, "Refinery Vapor Recovery Systems, Including Physical Properties and Utilization of Products." F. L. Chase presided at this session.

The morning session May 18 was given over to the paper by R. C. Alden. Discussion on this subject carried over into the afternoon. The paper had been printed in advance and delegates were prepared for the discussion. G. H. L. Kent, Humble Oil & Refining Company, Houston, gave a history of the East Texas field in presenting the conditions with regard to the manufacture of natural gasoline there.

Present handicaps in marketing as well as methods of overcoming these were offered by J. A. LaFortune, vice president of Warren Petroleum Company, Tulsa, whose paper was on "Natural Gasoline Markets and the New Grading System." A round table discussion on pipe line transportation of natural gasoline completed the program of the second day. E. L. Peck, Empire Gasoline Company, Bartlesville, presided at the morning session and G. M. Campbell, United Gas Public Service Company, Houston, in the afternoon.

Upon recommendation of the nominating committee all officials of the association were reelected. These are S. S. Smith, Shell Petroleum Corporation, Tulsa, president; G. M. Campbell, United Gas Public Service Company, Houston, O. C. Fields, O. C. Fields Company, Los Angeles, and Emby Kaye, Skelly Oil Company, Tulsa, vice presidents.

Directors to serve two years were elected to come from the following member companies Amerada Petroleum Corporation, Columbian Gasoline Company, Hanlon-Buchanan, Inc., Henderson Company, Phillips Petroleum Company, Sinclair Prairie Oil Company, Signal Oil & Gas Company, The Texas Company, Skelly Oil Company, Standard Oil Company of California, United Gas Public Service Company, Warren Petroleum Company and L. H. Wentz oil division.

REPORTS of the treasurer and routine matters were completed at the annual meeting of the Natural Gasoline Supply Men's Association in Tulsa, May 19. The meeting preceded the convention of the Natural Gasoline Association, for which the supply organization furnished entertainment.

Directors elected are A. W. Burket, Alco Products Corporation, Tulsa, president of the organization, to serve one year; M. H. Kotzebue, Tulsa Boiler & Machinery Company, Tulsa; J. H. Satterwhite, Westcott & Greis, Inc., Tulsa; M. F. Waters, Hanlon-Waters, Inc., Tulsa; and George W. Probst, Clark Brothers Company, Tulsa, to serve two years.

A. P. I. Research Projects Report Published

A SUMMARY of the results obtain from the program of fundamental research in petroleum, supported by John D. Rockefeller and the Universal Oil Products Company for the five-year period July 1, 1926, to June 30, 1931, is now being published by the Institute.

This research report will be sent free of charge to all members of the producing and refining divisions of the Institute, and is available to others at 50 cents per copy.

A. S. T. M. Round Table Discussion

IN order to point out the importance of statistical methods in the acquisition of good data and to stimulate interest in this subject, a round table discussion has been scheduled for the afternoon and evening of Monday, June 20, the first day of the annual meeting of the American Society for Testing Materials, at Atlantic City. Five informal papers are scheduled for the afternoon and three for the discussion which will be continued in the evening. The meeting will continue its session through June 24.

Hamilton, President La-Ark. Refiners

B. P. HAMILTON of the Root Refining Company, with headquarters in Shreveport, was elected president of the Louisiana-Arkansas Refiners Association, at its annual meeting held in El Dorado. He has been acting as first vice president.

Other officers elected are: C. M. Lamason, Louisiana Oil Refining Corporation, first vice president; B. H. Gray, Spartan Refining Company, Shreveport, second vice president; R. R. Brinkman, Shreveport, treasurer; and Leon C. Grosjean, Shreveport, executive secretary (re-elected). Headquarters of the association will remain in Shreveport.

Howard Bennett of the Western Petroleum Refining Association, addressed the meeting. Col. Barton, the retiring president, was host to those attending the meeting at a luncheon at his home.

New Theory of Lubrication Studied

AS an outcome of the work of the Lubrication Engineering Committee of the American Society of Mechanical Engineers, a new theory of the mechanism of lubrication has been developed and was presented to an informal conference at the Engineering Society Building on June 1, under the auspices of the A. S. M. E.

With a new machine, not only has the actual presence of these layers been confirmed but the lubricant has been found to peel off layer after layer. It has been further discovered that we finally reach an "ultimate" layer which does not peel off, even when enormous disruptive forces have been applied to it.

Another discovery has been that if the ultimate layer is wiped off the face of the metal a new layer of lubricant is immediately created thereon and, for example, in the case of a steel lubricated surface, as many as 21 layers of oil have been wiped off where the presence of even a single fluid layer has never been suspected before.

The paper has been prepared for the Lubrication Engineering Committee by William F. Parish, chairman of the committee, formerly chief of the Lubrication Department of the Air Service, War Department, and Leon Cammen, consulting engineer.

Wheeler Made President California Gasoline Men

R. C. WHEELER, General Petroleum Corporation, was elected president of the California Natural Gasoline Association June 9. N. H. Mull, The Texas Company, was elected vice president.

Directors elected are A. S. Hayes, Kettleman Hills North Dome Association; L. V. Cassady, Lomita Gasoline Company; R. E. Haylett, Union Oil Company; Earl Derby, Standard Oil Company of California; O. C. Field, O. C. Field Gasoline Corporation; H. L. Eggleston, Gilmore Gasoline Company; F. E. Coyle, Associated Oil Company; R. E. Wells, Jr., Rio Grande Oil Company; E. R. Pratt, Honolulu Consolidated Oil Company; R. H. Green, Signal Oil & Gas Company; W. N. Roper, Western States Gasoline Company; M. P. Simon, State Gasoline Corporation; P. S. Magruder, General Petroleum Corporation; B. A. Koehler, George F. Getty, Inc.; R. S. Lytle, Los Nietos Producing & Refining Company.

Wallace McIlhany was reappointed secretary.

Gasoline Volume Correction Tables

The United States Bureau of Standards is distributing Research Bulletin No. 393 by C. S. Cragoe and E. E. Hill, in which coefficients of expansion are presented covering gravity ranges of gasoline to include cracked gasoline and benzol blends. The correction factors applied to straight run gasoline as presented in U. S. Bureau of Standards Circular No. 154 issued in 1931, do not apply with present day cracked gasoline and benzol blends. Copies of the new Research Bulletin No. 393 can be secured from the Superintendent of Documents, Washington.

Lubricating Oil at 15 Cents Per Quart

TO meet competition from mail order houses, department stores, chain stores, accessory houses and corner lot peddlers, several refining companies are marketing a second grade of automotive lubricating oil at lower prices, averaging 15 to 20 cents per quart.

Standard Oil Company (Indiana) is offering "Stanolind" oils at 15 cents in various sections of its territory, along with the "Polarine" and its premium grade, "Isovis." Pure Oil Company at all of its stations in 35 states will offer a 15-cent oil, under the name "Allvis," which it has been previously selling in five-gallon cans at $2.25, to meet department store competition. Cities Service Oil Company

R. C. WHEELER

General Petroleum Corporation. New Head of California Gasoline Association

is selling a brand called "Blue Club" at several points in 15 states, at 15 cents per quart. Sinclair Refining Company has been marketing a special grade at a similar price of $2.25 per five-gallon can, but has not yet offered it through its service stations at "by-the-quart" prices. Barnsdall Oil Company and Deep Rock Oil Corporation are reported considering similar action.

Other companies operating in the Middle West are studying the situation and, it is thought, will ultimately adopt a similar policy. Western oils are being marketed at similar prices by some of the larger California companies, and it is anticipated that 15- and 20-cent lubricating oil grades will appear throughout the country in the near future. At least, such has been the experience in the past in the matter of marketing lower grades of products. This practice, it is hoped, will prove effective in increasing oil company volume of sales, and at the same time reduce the number and activities of vacant lot peddlers. Lubricating oil at 25 cents per quart (about the average price at present) brings $42.00 per barrel. Oil at 15 cents per quart brings $17.20 per barrel.

Oil Storage Tanks In The Petroleum Industry

THE Bureau of Mines has released an interesting discussion of tankage and survey of tanks in the petroleum industry, under the title "Oil Tanks Have a Capacity of More Than 1,000,000,000 Barrels." The survey separates refinery tankage from tanks used by the production branch of the industry and in the presentation of a number of tables and interesting editorial discussions, reveals that the refining branch has a total of 3120 steel tanks for storage of crude (about 94,000,000 barrels capacity) and 27,854 steel tanks for storage of refined products (about 260,000,000 barrels capacity). The survey was conducted by G. R. Hopkins, economic analyst, Petroleum Economics Division, Bureau of Mines. Copies can be secured from the Section of Publications of the Bureau at Washington.

Stanco Book On Iso-Propyl Alcohol

"THE Properties and Uses of Petrohol (Isopropyl Alcohol)" has been issued by Stanco Distributors, Inc.. (Standard Oil Company of New Jersey, subsidiary), 2 Park Place, New York. The 48-page book discusses properties of pure Isopropyl alcohol and of its mixtures with other organic liquids, its pharmacology, its uses as a solvent, an antiseptic, in perfumery, as a precipitant, its derivitives and their uses, and detection, and analysis of isopropyl alcohol. A number of tables and formulas are given with frequent references to the technial literature.

Letters to the Editor

May 20, 1932.

Dear Sir:

We were very favorably impressed with your recent editorial on prices. It seemed to us that this article was good hard horse sense and worth consideration by all manufacturers.

We brought this editorial to the attention of a number of our agents and confirm their endorsement of the thought you expressed.

We believe further editorials on the same line would be worth while.

Costs are so low now that it certainly is a good time to do a great deal of reconstruction work and improvement and there is no doubt about the amount which can be received per dollar spent. Also, companies who can afford it, should spend some money for these improvements in order to help the general volume of business. Big companies right now are afraid to spend money while at the same time it is to their interest to keep up local trade as it reflects directly back to their business. We believe this is particularly true of the large oil companies, who are dependent upon the public at large for the consumption of gasoline, oil, etc. There is no doubt but what many of these in turn have

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about lowering the cost of still tube cleaning, which every refinery engineer will want. It tells how and why the new 450 series Lagonda Cleaners, developed especially for cleaning stills, make new low time records in this operation.

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X-1489

the money but will not spend it at the present time.

Very truly yours,

Bremen, den 2. Mai, 1932

Dear Sir:

In the April number, 1932, of your REFINER I find a very interesting publication of Mr. P. G. Nutting: "The Bleaching Earths—A Laboratory Study."

In this article is frequently spoken about a bleaching earth "FLORIDIN" of the Floridin-Company, Warren and in the figures the sign "Fl." is regularly used as abbreviation for the product of this company.

I beg to draw your attention to the fact that the trademark "FLORIDIN" is exclusively registered in the European countries except Sweden for my firm, and that as well in the United States this trademark has been registtered in 1910 for my firm but has been seized in 1916 by the Alien Property Custodian which latter has transferred the trademark to the Chemical Foundation which actually is the owner of this trademark.

But owing to these facts the Chemical Foundation has granted to my firm an exclusive license to use the trademark "FLORIDIN" for my American Fullers Earth, mined and exported from U. S. A.

From the article of Mr. Nutting I had to see that this trademark "FLORIDIN" has been used for describing and marking another bleaching Earth. I therefore kindly ask you to publish a rectification saying that this was an error and that no other product except mine is allowed to be named "FLORIDIN."

Thanking you in advance for your favors, I am, dear Sirs,

Yours very truly,

HERMANN BENSMANN,

Bremen, Germany.

Table of Conversion Factors Compiled.

A COMPENDIUM of useful data for the rapid conversion of the common engineering units of measure of one system into the different but related units of another system, has been compiled by The Dorr Company, Inc., engineers, 247 Park Avenue, New York. This table, arranged in most convenient form was prepared to answer the need for a concise tabulation by the company's engineers, and at the request of these men the company has prepared several hundred additional copies for distribution to their friends and coworkers in the engineering profession. A copy can be secured by writing to the above address.

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PLANT ACTIVITIES

Operating—British Controlled Oilfields, Ltd., has a new light oil products recovery plant at its Trinidad refinery, part of proposed expansion program involving $500,000. (See Refiner & N. G. M., April, 1932, page 77-A.)

Helium Plant—The Navy has contracted for construction at Sunnyvale, California, a helium repurification plant to the Helium Company, at a cost of $133,500. Other contracts, bringing the total appropriation to $383,827, were let for industrial buildings and boiler plant equipment and piping systems.

Skimming Unit — Phillips Petroleum Company plans a 7500-barrel skimming distillation unit at its Kansas City, Kansas, refinery. Included in this expansion work is a modern stabilization system. While the new unit will replace old shell stills, auxiliary facilities are to be provided to permit reforming operations. The company is reported planning additional cracking facilities at Okmulgee and Borger, Texas. (Ref. & N. G. M., April, 1932, page 76-A.)

Cracking Installation—Tide Water Oil Company has completed two Tube and Tank cracking units, with a combined capacity of around 9000 barrels per day at Bayonne, N. J. Units constructed by Lummus Company working with the Tidewater engineering department. Worthington gas engine driven hot oil pumps, are used. The process is licensed by Gasoline Products Company, 405 Lexington Ave., New York. (Ref. & N. G. M., Dec., 1931, page 131, and March, 1932, page 72-A.)

Lube Units—Yacimientos Petroliferous Fiscales (Argentine Government) through Minister of Agriculture de Tomaso, Buenos Aires, Argentina, has awarded contract for two refining units for manufacture of lubricating oils and other products at the La Plata refinery to Alco Products. (Ref. & N. G. M., April, page 78-A.)

Recovery Plant—Associated Oil Company has awarded contract for construction of a gasoline recovery system, at Avon, California, to Foster Wheeler Corporation. Estimated cost reported to exceed $40,000.

Refinery—The South American Consolidated Oil Company is reported to have built a refinery of 10,000 barrels daily capacity in Venezuela. Department of Commerce, Trade Information Bulletin No. 784 reports a refinery of this capacity as "An American company," to which permit was granted on December 26, 1930. Otherwise available reports do not indicate a new 10,000-barrel refinery in that country.

Cracking Units—Marathon Oil Company, after dismantling old equipment, is installing modern cracking facilities at Bristow, Oklahoma, preparatory to the production of motor fuel of higher octane rating. Work is to be completed this summer. (Ref. & N. G. M., Vol. 11, No. 3, March, 1932, page 71-A.)

Recovery Plant—Shell Petroleum Corporation is erecting a new absorption gasoline recovery plant and stabilization unit at Houston, Texas, to replace the compression system formerly in use. The new system will have a capacity of 7,000,000 feet of gas daily. This work is in conjunction with the company's expansion of cracking facilities, consisting of new Dubbs units. (Ref. & N. G. M., Vol. 11, No. 1, January, 1932, page 66-A, March, 1932, page 71-A.)

Russia—U. S. R. R., at Grozni and Baku, is erecting two 10,000-barrel two-stage atmospheric-vacuum distillation plants and five 6000-barrel single stage vacuum distillation units which are being installed by Alco Products, Inc., New York. The two-stage units are similar in design to those present in the Process Number of Refiner & Natural Gasoline Manufacturer, Vol. 11, No. 2, February, 1932, pages 84 and 86.

Stabilizing Plant—Hanlon-Buchanan, Inc., is planning to enlarge its Good Hope, Louisiana, natural gasoline stabilizing plant and export terminal, according to reports following a visit to New Orleans by E. I. Hanlon and D. E. Buchanan, chairman and president of the company.

Cracking Unit—Bobrose Oil & Refineries, Inc., San Antonio, Texas, plans construction of a modern cracking unit at its Luling, Texas, refinery some time this summer. H. E. Read is general superintendent of refineries, and R. E. Goode is chief chemist.

Refinery—Imperial Oil Company, Ltd., 56 Church St., Toronto, Ontario, Canada, is reported planning a $1,000,000 refinery near Cartagena, Colombia, South America. The proposal is contingent upon tariffs and restrictions upon oil importation into the United States, and of indefinite maturity.

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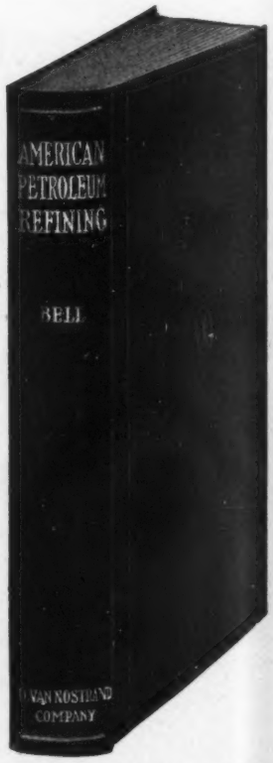

Every detail of American refinery practice—the most up-to-date developments as well as the standard methods—are fully covered in this book. Vapor phase cracking, the production of high compression gasoline, the development of modern pipe stills, the use of Diesel engines in oil pumping, and hundreds of other subjects of equal interest and importance, are discussed, covering in full every detail of oil refinery operation, engineering, and design.

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tion is reported contemplating a new refinery at Mexico City. Maturity not reported.

Cracking Units—Huasteca Petroleum Company, has started construction of new cracking units at its Tampico, Mexico, refinery scheduled to be in operation by the end of this year. This plant is controlled through Pan-American Petroleum and Transport Company, through Mexican Petroleum Company, and is involved in the recent deal whereby Standard Oil Company of New Jersey is taking over the foreign properties of Pan-American Petroleum & Transport Company. The work was previously announced in Refiner & N. G. M., March, 1932, page 71-A.

Refinery—Shell Company of Canada, Ltd., Hamilton, Ontario, Canada, is erecting a 285,000-barrel storage and distributing plant, and as reported in March (Ref. & N. G. M., Mar., 1932, page 72-A) is going ahead with construction of its Canadian refinery in the near future.

Refinery—Cities Service Company plans to start construction of its new refinery near Toronto, Ontario, Canada, immediately. Capacity 3000 barrels daily with cracking equipment (Doherty) designed to improve anti-knock value of the motor fuel. It will be operated by the company's Canadian subsidiary. Contracts have been let to Alco Products, Incorporated.

Refinery—Jacob Oil & Gas Company, Graham, Texas, is scheduled to place in operation late in June a 500-barrel daily capacity skimming plant located about four miles east of New Castle, Young County, Texas. Crude controlled by the company in the area will be the principal source of supply for the plant, which will market locally.

▼ Changes ▼

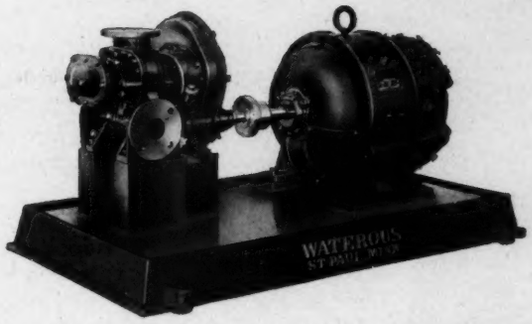
Moving—Olympic Refining Company, Long Beach, California, plans to move its Lovell, Wyoming, refinery to Baca, New Mexico, where it is to process oil from the Hospah Dome, McKinley County. Capacity is reported at 1200 barrels. About 35 miles of pipe line will transport oil from the field to the plant in its new location.

Merge—Fred G. Clark Company and Conewango Refining Company are merging and consolidating general offices of the two companies in Warren, Pennsylvania. The Clark company owns controlling interest in the refining organization. H. R. Lewis, has been elected president of the company. He was formerly vice president of the Conewango company. J. J. McNerney, president of the Hy-Vis Oil & Refining Company of Los Angeles, is now president of the Fred G. Clark Company and vice president of the Conewango Refining Company. (Ref. & N. G. M., Vol. 11, No. 5, May, page 54-A.)

Receivership—Producers & Refiners Corporation, following filing of a bill of complaint by The Consolidated Oil Corporation (holding company in the recent merger of Sinclair and Prairie companies) is operating in receivership with L. R. Crawford, president and P. C. Spencer, general counsel as ancillary receivers. The complaint alleged that notes of the Producers & Refiners Corporation which were secured by the Prairie Oil & Gas Company, were due and the corporation was unable to pay them. The receivership was not contested by the defendant company. Producers & Refiners Corporation has producing properties, including large gas holding, and operates refineries at Parco, Wyoming, and West Tulsa, Oklahoma,

WATEROUS

HEAVY DUTY ROTARY PUMPS



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Marley patented spray nozzle, used in all Marley cooling systems and now leading the field in sales.

Step by Step

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FIRST, the Marley patented spray nozzle of recognized superiority.

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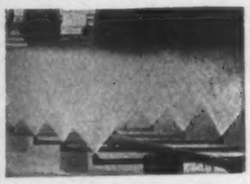
And finally, the Marley forced draft cooling tower with Marley spray distribution as standard equipment!

Thus has the complete Marley line of cooling systems been developed—with the outstanding superiority of the Marley spray nozzle as the foundation—and other important improvements as added advantages.

When you plan to install new cooling systems or to improve old ones, it will pay you to investigate the Marley line.



Marley spray pond, equipped with Marley patented spray nozzles.

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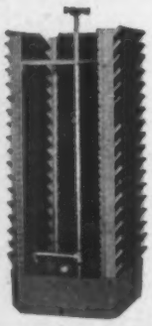
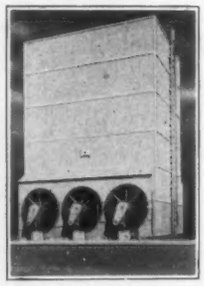


Marley Type G spray tower with Marley spray system installed at top.

Marley spray deck tower equipped with Marley spray system and Marley louvred louvers.



Marley forced draft cooling tower with Marley spray system as standard equipment.

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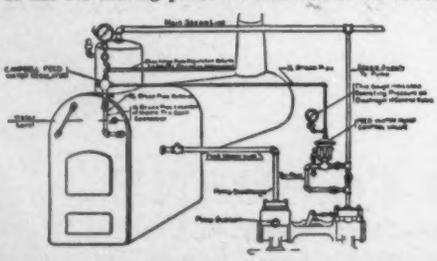

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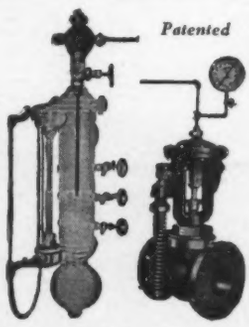
Rugged.
Dependable.
Easily installed.
No servicing required.

Patented



ATLAS VALVE CO.,
275 South Street, Newark, N. J.

also owning interest in jobbing companies. The company was organized by the Kistler interests, the Prairie Oil & Gas Company securing a stock interest in 1923. It is thought that the properties will be absorbed by subsidiaries of Consolidated Oil Corporation.

Leased—Rado Refining & Producing Company of Laredo and Fort Worth, Texas, has leased for three years the Laredo refinery of Texas-Mexican Oil & Refining Company. The plant has a rated capacity of 600 barrels per day. The leasing organization was recently formed with a capital stock of $10,000, with the following officers: W. B. Pape, San Antonio, president; Henry B. May, vice president and O. B. Stephens, secretary-treasurer, both of Fort Worth. The plant was formerly operated as a lube oil producing unit, and necessary equipment to operate as straight skimming plant is being installed.

New Operators—Danciger Oil & Refining Company, producers in the Mid-Continent area during the past 15 years, has completed plans for the operation of the two refineries owned by Petroleum Refractionating Corporation, as subsidiary company. For the past several years the Pampa, Texas, refinery has been operated by Bell Oil & Gas Company, but on May 15, Petroleum Refractionating Corporation took over the plant operation, with E. C. Roff as superintendent. During June the Danciger interests will start operating the 12,000-barrel refinery erected last year at Longview, in the East Texas field. Reports contemplate erection of a cracking unit at the East Texas plant.

Completed — Magnolia Petroleum Company has completed construction at its Fort Worth refinery, and part of the equipment is now in operation. One of the Cross units was rebuilt and modernized, including a new furnace, and a new cracking unit was installed; this work being done by M. W. Kellogg Company. A new gasoline recovery and stabilization system was installed by C. F. Braun Company.

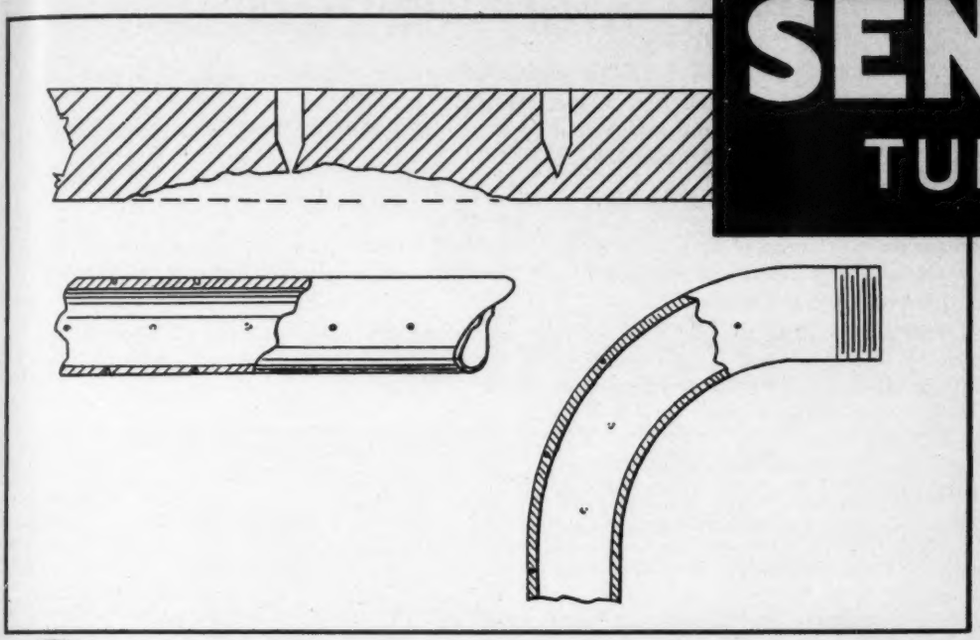
New Company — Marland Oil Company of Oklahoma has been organized by E. W. Marland, Ponca City, Oklahoma, with a capital stock of $1,000,000. In addition to Marland, other directors reported are J. S. Alcorn, G. R. Marland, I. G. Harmon and A. W. McCoy. The company was incorporated to produce and ship oil, to operate refineries and to "engage in a general oil or mineral brokerage business by buying, selling, or otherwise trading in mineral leases and royalties, and the products and by-products of such leases."

Resume—Kettleman Hills Gasoline Company has forfeited its lease of the 3000-barrel refinery at Hanford, California, and the owner, H. H. Bell of Bakersfield, is making preparations to have the plant resume operations.

Refinery—Joseph Elie, Ltd., Montreal, Quebec, Canada, has placed contract with Foster Wheeler, Limited, Canadian subsidiary of Foster Wheeler Corporation, for construction of an atmospheric distillation unit at East Montreal, near the recently completed refinery of British American Oil Company, Ltd. Earlier reports concerning this activity appeared in Refiner & Natural Gasoline Manufacturer, April, 1932, page 75-A.

Vacuum Unit—Associated Oil Company, San Francisco, has placed contract with Foster Wheeler Corporation for construction of a vacuum redistillation unit to process treated lubricating oil at Avon, California.

NATIONAL
SENTRY
TUBING



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National Sentry Tubing answers a very definite demand of refinery engineers. This demand is for pipe and tubes which when installed in and around a pressure still will not be subject to unexpected and dangerous failures due to internal corrosion or wear. When the walls of National Sentry Tubing are thinned by either erosion or corrosion from within, a tiny leak will appear through a small hole drilled part way through the pipe or tube wall especially for this purpose. This hole is cone-shaped at the bottom, and as the wall is gradually eaten away, the hole grows larger and the leak becomes plainly noticeable, indicating that the metal has been worn at this point.

Experiments carried on by refinery engineers in the field, demonstrated the soundness of the method involved, but drilling into equipment in actual use, at a sufficient number of points, at proper intervals, and with proper control of depth, was too burdensome and costly. National Sentry Tubing is pre-drilled under a technique that is definite and embodies all that has been found most satisfactory in pipe and tubes for such use. Actual bursting tests show that this drilling does not impair the strength of the pipe and tubes.

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SCIENCE AND TECHNOLOGY

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under the supervision of
DR. E. H. LESLIE and DR. H. B. COATS

The abstracts here presented are selected from the current literature of science and technology to afford reference to fundamental information not easily available to all readers. Abstracts of articles appearing in readily obtainable trade journals are not included.

Photostat copies of original articles will be supplied at cost by the Leslie Laboratories. Complete or limited bibliographies covering special topics by title, by abstract, or in complete manuscript, will also be prepared and furnished at reasonable cost by the Laboratories.

Fundamental Physical Data

Specific Heat of Mineral Oils. H. KRAUSSOLD. *Petrol. Zeit.* **28** (1932), No. 3, pp. 1-7.

Specific heats of crudes, gas oils, and turbine oils were determined by use of an electrically heated colorimeter. The specific heat is given with an accuracy of ± 3% by the equation $c = a + b\ (t - 15)$ in which "b" = 0.0011 is the temperature coefficient, "a" = $0.937 - 0.56.d_{15}$ when d_{15} is greater than 0.9, or "a" = $0.711 - 0.308d_{15}$ when d_{15} is less than 0.9. "t" is the temperature in °C, and d_{15} the sp. gr. at 15°C. The range covered extends to 400°C.

The Thermal Conductivities of the Saturated Hydrocarbons in the Gaseous State. W. B. MANN and B. G. DICKINS. *Proc. Roy. Soc.* (London) **A134** (1931) pp. 77-96.

The conductivities were determined by the hot wire method. At 0°C. the following values (multiply each figure by 10^{-5}) were found: Air 5.79, methane 7.21, ethane 4.36, propane 3.60, n-butane 3.22, iso-butane 3.32, n-pentane 3.12, n-hexane 2.96. The temperature coefficient was determined.

Explosion Limits of Mineral Oil Vapor-Air Mixtures. F. PACHTNER. *Petrol. Zeit.* **28** (1932) No. 4, pp. 1-4.

Explosion limits of various hydrocarbon vapor-air mixtures were investigated. These contained hydrocarbons from ethane to dodecane. Vapors of ethane to octane from explosive mixtures. The vapors of hydrocarbons of ten or more carbon atoms are present in too low concentration at ordinary temperatures to form explosive mixtures. Explosion limits vary with the dimensions and material of the container. At 100°C. the lower limit is 1.1% of vapor by volume in the mixture. The upper limit is about 12.5%. At 200 mm. pressure the limits are 1.5% to 2.6%.

Relation Between Viscosity and Constitution of Hydrocarbons of High Molecular Weight. G. HUGEL. *Chimie et Industrie* **26** (1931) pp. 1282-8.

The author concludes that viscosity is closely related to the cyclization of a hydrocarbon molecule. Unsaturation and side-chains also change viscosity. The principal way in which viscosity increases in the acyclic or straight-chain series is through increase in molecular weight. The cyclic hydrocarbons on the other hand, have what may be termed a viscosity producing center, that is, the ring. Alcoholic OH groups also constitute such a center. Hydrocarbons of various types were synthesized and studied in reaching these conclusions.

Chemical Composition and Reactions

Action of Some Mercaptans in Hydrocarbon Solution on Copper and Copper Sulfide. K. H. SLAGLE and E. E. REID. *Ind. Eng. Chem.* **24** (1932) pp. 448-51.

In a study of what was thought to be the adsorption of mercaptans by copper sulfide it was found that the mercaptans react with copper and copper sulfide to give cuprous mercaptides and disulfides. The insoluble cuprous derivatives of the primary and lower secondary mercaptans remain on the copper. The higher secondary mercaptides are soluble and color the hydrocarbon solvent. Alkyl sulfides and disulfides do not react with copper or copper sulfide.

The Preparation and Properties of a Double Series of Aliphatic Mercaptans. L. M. ELLIS, JR., *and* E. E. REID. *Jour. Am. Chem. Soc.* **54** (1932) pp. 1674-87.

The normal and alpha secondary mercaptans from methyl through nonyl were prepared. The densities at 0° and 25°C., and the refractive indices at 25°C. were determined. Melting points and boiling points at various pressures for the higher mercaptans were also determined. Other related alcohols and bromides were studied.

Thermal Decomposition of n-Butane into Primary Products. MAX NEUHAUS and L. F. MAREK. *Ind. Eng. Chem.* **24** (1932) pp. 400-2.

The thermal decomposition of n-butane was studied at 600°C. and at 650°C. The primary reaction products, listed in order of importance, were found to be methane and propylene, ethane and ethylene, hydrogen and butylene, and propane. Butadiene and aromatic hydrocarbons were not formed. Reaction velocity constants for the primary reactions were calculated.

Highly Cracked Gasoline. C. R. PAYNE and A. LOWY. *Ind. Eng. Chem.* **24** (1932) pp. 432-5.

A gasoline distillate produced in a commercial vapor-phase cracking unit was heated at 300°C. for 6 hours in a steel bomb. The corresponding pressure was 68 atmospheres. The original material and the heat-treated material were examined. The percentage of olefines dropped markedly. The percentage of naphthenes increased. Polymerization causes an increase in proportion of material boiling above 201.5°C., disappearance of cyclo-alkenes, and formation of hydrocarbons containing hydrogen atoms easily replaced by halogen. The original cracked distillate contained aromatics and probably some methyl cyclo-butane. The proportion of olefines and parafins decreased with boiling point, and those of naphthenes and aromatics increased.

Oxidation Mechanism of Mineral Oils. T. YAMADA. *J. Soc. Chem. Ind., Japan* **34** (1931) pp. 493-5B.

Mineral oils oxidized in open or closed vessels at 120°C. in the presence of $CaCl_2$ have lower saponification, acid, and acetyl values than the same oils oxidized without the addition of $CaCl_2$. The oxidation of oil at 100°C. is accelerated by $CaCl_2$ but retarded by KOH and P_2O_5. Water aids the formation of acidic substances.

A Connection Between Fluorescence and Free Neutral Radicals. W. A. WATERS. *Nature* **128** (1931) pp. 905-6.

The author suggests that fluorescence is caused by the recombination of neutral free atoms to form diatomic molecules. Evidence in favor of this supposition is found in the fluorescence of sodium and mercury vapors containing Na_2 and Hg_2, inhibition of fluorescence only by substances that easily lose an electron and combine with free radicals, limitation of fluorescence among organic compounds (such as oils) to those containing aromatic ring systems of unsaturated structure and that are capable of yielding free radicals and characteristic Tesla luminescence spectra shown by those aromatic compounds that are associated tautomerically through the valency bonds of the two "Kekule" phases.

Manufacture, Processes and Plant

Determination of True Temperature and Total Radiation from Luminous Gas Flames. H. C. HOTTEL and F. P. BROUGHTON. *Ind. Eng. Chem., Anal. Ed.* **4** (1932) pp. 166-75.

The subject matter of this paper is of importance in furnace design, particularly of those furnaces in which it is desired to use energy absorption in a radiant section. The paper presents data to prove the possibility of determining true flame temperature and total emissivity of a luminous flame from a pair of apparent

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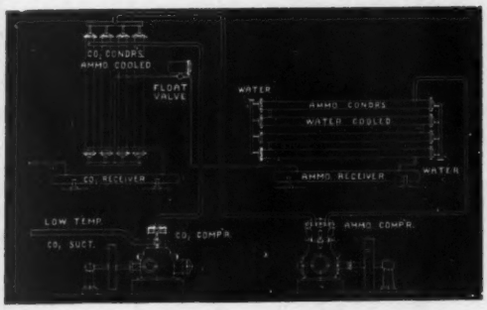

Diagram Showing Arrangement of Equipment in a Frick Plant to Produce Low Temperatures on the Split-Stage Principle

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temperatures obtained by use of an optical pyrometer and using color screens of two different effective wave lengths successively. One to six amyl acetate flames were used. Red and green brightness temperatures were determined. The average deviation from the mean of the predicted true temperatures was only 4°C. Total flame radiation was calculated and compared with independent measurements of total radiation made by a narrow-angle thermopile. The conclusion is reached that the radiation from luminous flame can be determined by the method used with an average error of 5%.

Dehydrating Commercial Propane. K. H. HACKMUTH. *Western Gas* **8** (1931), Jan. pp. 55-6, 62, 64.

Traces of water vapor in propane are highly objectionable in cold weather. Fractionation is the best method of dehydration. Cobalt bromide is used to detect and estimate water in propane. The colors of the indicator corresponding to humidity percentages are given. The method is applicable to other hydrocarbons containing water.

Dewaxing Lubricating Oils With Methylene Chloride. P. J. CARLISLE and A. A. LEVINE. *Ind. Eng. Chem.* **24** (1932) pp. 384-7.

Methylene chloride (dichloromethane) was used as a selective solvent in dewaxing a wax distillate and a long residuum. This solvent dissolves oil in all proportions at temperatures down to —50° F., whereas at low temperatures wax is only slightly soluble. The wax separates in a crystalline condition and can be removed by filtration without use of a filter-aid or by centrifuging. Rate of chilling is not important, and can be rapid without causing separation of wax in amorphous form. The solvent is readily recovered by distillation. The cost of the solvent is not prohibitive. The literature of dewaxing solvents is reviewed.

Refrigeration Systems Applied to Demands of Industry. L. H. MORRISON and H. C. DUUS. *Chem. & Met. Eng.* **39** (1932) pp. 228-33.

A discussion of refrigeration systems including the compression, absorption, adsorption, and evaporation types of mechanical systems, and modifications and combinations of these. The principles guiding the choice of a refrigerant are outlined.

Solubility of Some Indigo Dyes in Oil. H. LEDERER. *Petrol. Zeit.* **28** (1932) No. 2 pp. 5-6.

Within the last several years gasolines have been colored red, blue, or green with oxyazo dyes and others such as Sudan G (I) and Carmin Naphtha (II). Indigo will impart a blue color to oils if heated and stirred at 100-120° C. and an addition of 0.5-1.0% of sulfuric acid that can be removed with sand or bleaching earth. Indigo O4B and indigo red HR color oils bluish-green and red, respectively. The solutions of these dyes are stable when dissolved in oil at 100° C.

A number of indanthrenes and algol dyes were studied and it was found that of these only indigo MLB 4B and thioindigo red were sufficiently soluble in oil. The colors obtained by oxidation of indigo in oil and by dissolving the vat dyes in oil are the same. The dyes are present in solution and not in suspension.

Products: Properties and Utilization

Color and Precipitation Tests of Mineral Oils. F. SCHWARZ. *Allgem. Oesterr. Chem. und Tech. Ztg.*, **50** (1932), Nol, pp. 3-7.

Qualitative results only are given. $SnCl_4$, $TiCl_4$ or $SbCl_5$ in normal benzine solution when added to a mineral oil produce characteristic colors and precipitates. The depth of color and nature of the color change as the boiling point of the oil increases. Asphalt-base oils and paraffin-base oils give different results. It is suggested that these reagents might be used in the approximate determination of petrolenes, mathenes, asphaltenes, and carbenes. The effect of the reagents must be observed under a microscope with a magnification of at least 150 diameters.

Influence of Tetraethyl Lead on Knock Rating. L. E. HEBL and T. B. RENDEL. *Jeur. Inst. Pet. Tech.* **18** (1932) pp. 187-96.

Data are presented that serve as a basis for the development of an expression for the susceptibility of gasolines to addition of tetraethyl lead. The value of K in the relationship

$$K = \frac{\log I - \log S}{\log N}$$

for 60 gasolines was found to be 0.75. In this equation I is the increase in H.U.C.R., S is the lead susceptibility and N is the milliliters of tetraethyl lead added per gallon. Gasolines were found to vary greatly in their susceptibility to lead. California gasoline is most susceptible, Mid-Continent next, West Texas next, and cracked gasoline least susceptible. Natural gasoline, even when added in small quantity so that the H.U.C.R was not much affected, materially increased the lead susceptibility. Volatility, as determined by the Whatmough dew-point, is in linear relationship to H.U.C.R. If straight-run

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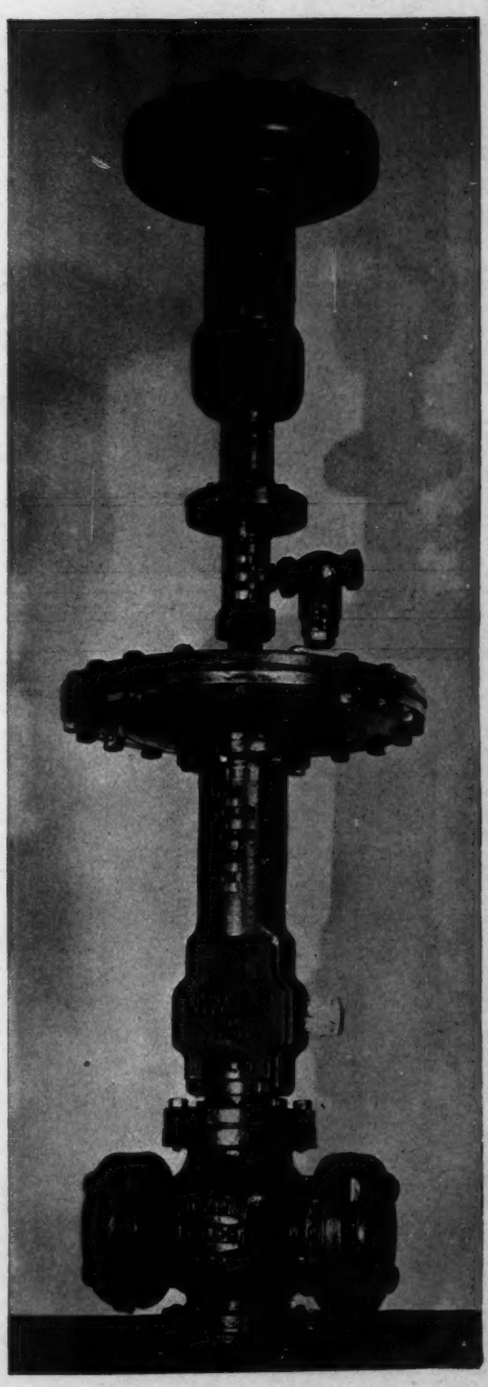

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and cracked gasolines are blended the H.U.C.R. is raised but the lead susceptibility is decreased. Doctor treatment lowers the H.U.C.R. but does not much affect lead susceptibility.

Photographic Investigation of Flame Movements in Gaseous Explosions. W. A. BONE and R. P. FRASER. *Trans. Roy. Soc.* (London) **230A** (1931) pp. 363-85.

Flame movements in explosive mixtures of carbon monoxide and oxygen, saturated with water vapor, were studied. Detonation can be originated in a sufficiently explosive mixture at the instant of ignition. The distance of flame travel before detonation occurs depends upon the rates of initial flame speed to that of the shock wave originated by the detonator. During the stage of an explosion preceding detonation several successive ignitions ahead of the flame may occur. These auto-ignitions apparently depend on the proximity of a flame front traveling faster than sound to a shock wave moving ahead of the flame front. The banded appearance of detonation flames appears to be explainable by the view that the spin observed is not movement of the gaseous medium as a whole but to the spirally moving detonation wavefront. The banded appearance is probably the result of periodic waves along the flame. Numerous photographs illustrating these phenomena are included.

Interpolation Method in Routing Detonation Testing. D. B. BROOKS. *Jour. S.A.E.* **30** (1932) pp. 54-6.

Four engines were used, a General Motors fuel research engine, an Ethyl Gasoline S30, and two C. F. R. engines of the latest type. The "bracket" is the difference in octane numbers of reference fuels used to match the fuel of unknown octane numbers. The author concludes that a bracket of 10 is practical if the bouncing pin is properly adjusted. An accuracy of 0.1 octane number can be secured in the range of 50 to 80 octane number with proper pin adjustment. It is suggested that by use of the new four-bowl carburetor on the C. F. R. engine it is practical to rate nearly all fuels in ordinary use without changing reference fuels.

Ignition of Hydrocarbon-Air Mixtures by Hot Spots. M. AUBERT and A. PIGNOT. *Ann. Comb. Lig.* **5** (1931) pp. 819-28.

Ignition from hot spots in an engine causes loss of power. The authors studied the minimum temperature of hot spot that would cause reaction of fuel and air and the speed of this reaction. Use was made of a small coil of 0.1 mm. platinum wire mounted within a cylinder having measured and controlled wall temperature. The temperature of the wire could be calculated from known electrical input. The reaction taking place on the surface of the wire changed the temperature of the wire and hence its resistance. Time-voltage curves were obtained for several type hydrocarbons.

Combustion in a High-Speed Compression-Ignition Engine. A. M. ROTHROCK. *Natl. Advisory Comm. Aeronautics Report, No.* **401** (1931) pp. 3-17.

Increasing the maximum rate of combustion increases detonation in a Diesel-type engine. Combustion efficiency and maximum rate of combustion are increased by lengthening the time lag of auto-ignition in a quiescent combustion chamber. The initiation of combustion can be caused to take place during injection by raising the air temperature. In this manner detonation can be prevented. Rate of fuel injection does not in itself control combustion rate.

Incorporation of Graphite with Motor Oils. E. KADMER. *Petrol Zeit.* **28** (1932), No. 7 Motorenbetrieb 5, pp. 2-3.

Reduction of operating costs, increased power, and greater adaptability to varied conditions of use result from mixture of graphite with lubricating oils. Graphitized oils such as "Kollag" and "Oildag" were studied.

Reclaimed Lubricating Oils. R. ASCHER. *Automobiltech. Z.* **35** (1932) p. 20.

Oil that is too highly refined is not as stable in the engine as under-refined oil. An oil that has not been seriously decomposed in use has a higher viscosity and better lubricating properties than the original oil. Reclaiming of oil is recommended.

Comparative Values of Heat in Coal, Oil and Gas. S. H. VIALL. *Chem. & Met. Eng.* **39** (1932) p. 234.

Three charts are given on one page by use of which comparisons can be made of the three fuels for different fuel costs, B.t.u. values, and efficiencies of utilization.

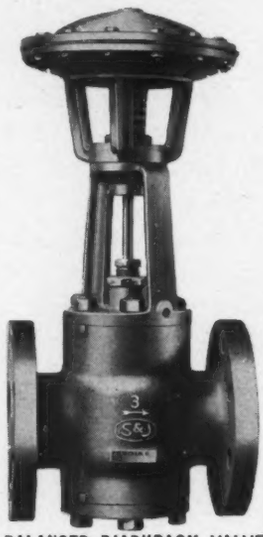
New Type of Asphalt Penetrometer. A. WOLF. *J. Sci. Instr.* **9** (1932) p. 22.

The penetrometer is similar in general design to the standard instrument. However, the needle is replaced by a rod and larger loads and longer contact times are used. A test is completed in five hours. The method is not applicable to asphalts containing mineral particles. For these it is proposed to construct

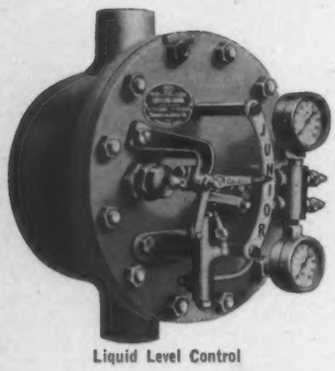
S&J

EQUIPMENT *gives*

EXACT PROCESS CONTROL



BALANCED DIAPHRAGM VALVE



Liquid Level Control

Other S & J equipment includes safety equipment for tanks and tank-trucks, measurement devices, etc. Ask for Bulletins No. 51 and 52.

The vitally important task of process control can be safely left to S & J equipment. Ruggedness of mechanical construction permanently protects the super-sensitive operation of these most up-to-date instruments.

S & J Diaphragm Valves are furnished in either balanced or poppet types as required. The new balanced valve is designed for direct or reverse acting service. This change-over feature requires no additional parts and takes but a short time.

S & J Liquid Level Controls are furnished in many styles suited to every known refinery need. Ingenious design permits installation on standard man hole covers eliminating pipe make-up. Regularly furnished with steel-pot in modifications up to 1,000 pounds per square inch.

Send for Bulletin No. 50-A for complete details of this outstanding equipment.

SHAND AND JURS CO.

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"SO WE LINED 'ER WITH STAINLESS"

A new still was needed. New stills were often needed until a certain refining engineer got the idea of spot-welding a lining of Stainless Steel to the interior. "There's a 'real film of protection'" he'll tell you. "It pays for itself many times over." There are many places in oil handling equipment where "Stainless" is an economic need—where your repair and replacement costs would more than pay for it in a short time. Why not have "Stainless"? Genuine Stainless Steel is manufactured only under the patents of American Stainless Steel Company, Commonwealth Building, Pittsburgh, Pa. Write for our new booklet . . . Today.

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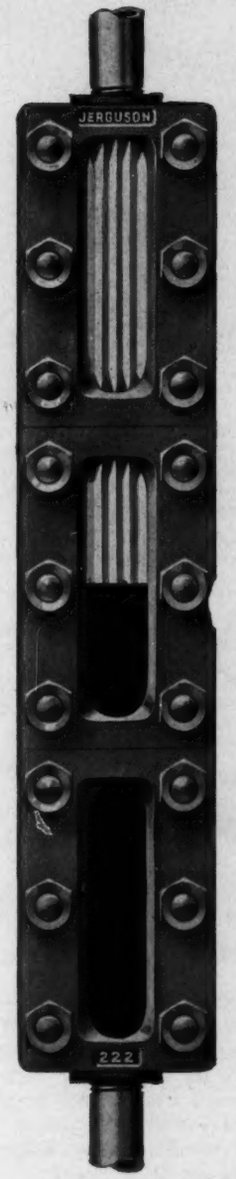
REFLEX GAGES

have been used for steam boilers for 25 years and are now being used by leading oil companies for indicating oil levels in tanks, towers, stills, etc.

The *empty* space appears WHITE



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They are safe and durable at the highest pressures and temperatures. We can furnish gages with or without valves for every type of service. Full information upon request.

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It keeps the DISCHARGE FROM COMPRESSOR CONSTANT

THROTTLING REGULATOR

One of 40 regulators produced with skill and care by the pioneer gas regulator manufacturers of America. C-F products, in range and applications, encompass all practical requirements.

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Built especially for this service, the C-F Throttling Regulator is entirely dependable in uniformity of action. With performance always punctual as well as precise, it permits ideal compressor operating conditions insofar as constant discharge control is any factor.

The Chaplin-Fulton Mfg. Company

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes, from 1 inch to 24 inches; for all Service, 1 oz. up to 2,000 lbs. Pressure to Square Inch.

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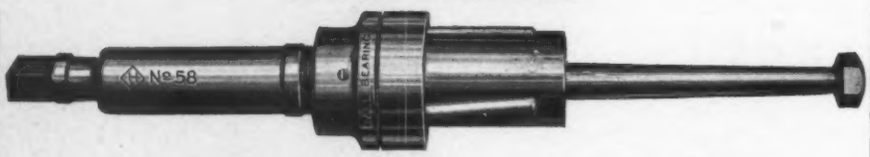
Heavy Duty Expanders for Still Tubes



Tools for the Oil Industries

Hydraulic Pressure Pumps, 8000 pounds
Tube Expanders for Cracking Still Tubes
Hydraulic Pressure Pumps, 2000 pounds
Tube Expanders for Condenser Tubes
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Tube Expanders for Steam Boilers
Screw Punches for Structural Shapes
Tube Expanders for Pipe Work
Screw Punches for Plate Work
Flaring Tools for Still Tubes
Beading Tools for Still Tubes
Hydraulic Jacks
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Established 1870
Expanders since 1884

another instrument with a larger plunger and heavier weights.

Composition of Straight-Run Pennsylvania Gasoline. I. Design of Fractionating Equipment. M. R. FENSKE, D. QUIGGLE and C. O. TONGBERG. *Ind. Eng. Chem.* **24** (1932) pp. 408-18.

The literature of laboratory fractionating apparatus is reviewed. A three-inch diameter column 27 feet long and a ¾-inch diameter column 52 feet long are described and results of efficiency tests given. Reflux ratios as high as 50:1 were used. Crude di-isobutylene was separated into two isomers boiling 3.3° C. apart.

Automatic Open Cleveland Flash & Fire Equipment. Testing Laboratory, Port Arthur Works, The Texas Company. *Ind. Eng. Chem., Anal. Ed.* **4** (1932) p. 209.

A flash and fire test apparatus is described. The test flames are mechanically applied, sensitive gas valves are used that permit accurate control, pilot lights for burners and test flames are provided, hot gases are removed by an exhaust system, and the test flames are protected from draughts. Requirements of the A. S. T. M. are met in all respects.

Determination of Tetraethyl Lead in Ethyl Gasoline. E. L. BALDESCHWIELER. *Ind. Eng. Chem., Anal. Ed.* **4** (1932) pp. 101-2.

Two hundred cubic centimeters of the gasoline is extracted twice with 20 cc. conc. HNO_3 and 20 cc. water. The solutions so obtained are combined and evaporated to 20 cc. volume. 15 cc. of cone. H_2SO_4 is added and the solution boiled to evolution of SO_3 fumes. Nitric acid is added if charring occurs and until the solution is colorless. 25 cc. water is added and the solution concentrated to evolution of SO_3. The volume is increased to 150 cc. with water and the lead sulfate filtered on a Gooch crucible, washed with 2% H_2SO_4 followed by 95% ethyl alcohol, and ignited and weighed.

Natural Gas—Analysis

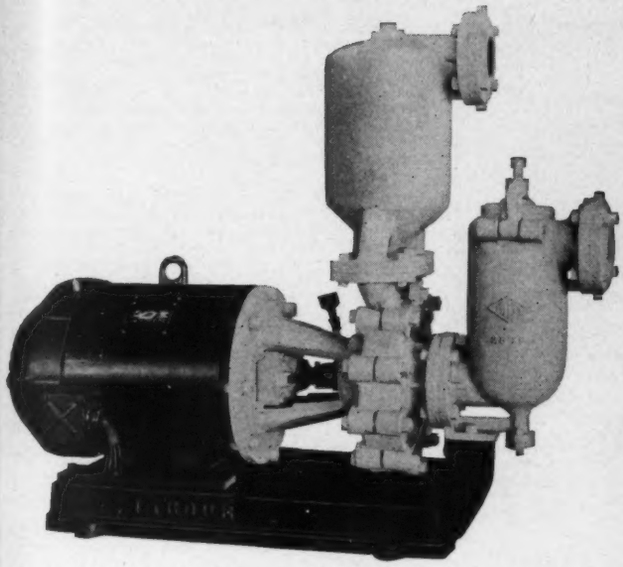
Analysis of Hydrocarbon Gases. H. S. DAVIS and J. P. DAUGHERTY. *Ind. Eng. Chem., Anal. Ed.* **4** (1932) pp. 193-7.

An apparatus and method for the analysis of natural or refinery gases is described. No liquid air is required. The gas is liquefied in part by slow passage through a condensing zone at —80° C. This temperature is maintained by means of a carbon dioxide snow and acetone bath. The condensate is fractionated in a simple type of column. Several cuts are made, and these are analyzed for component hydrocarbons by ordinary gas-analytical procedures. Results of analyses of synthetic gas mixtures indicate that the method gives excellent results.

A new Physical Method for the Analysis of Gas Mixtures, Especially Those Consisting of Hydrocarbons. W. J. D. VANDYCK. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 145-78.

The method described is applicable to natural gases or refinery gases, and is designed to determine the hydrocarbons of five or more carbon atoms, butanes, propane, and lower molecular weight gases. The procedure is based on the difference in solubility of the gases in a liquid and is designed to eliminate the necessity of complicated apparatus and liquid air. The application of the apparatus and method to numerous typical gases is illustrated with data, graphs, and calculations.

SAFE



This LaBour self-priming centrifugal pump, direct mounted with an approved explosion-proof motor, provides an economical and completely SAFE unit for moving refinery liquids. Not only has the fire hazard due to motor and coupling been removed, but far greater safety in handling dangerous fluids results from LaBour's ability to prime itself, to handle vapor as well as liquid.

With LaBour Pumps, bottom outlets in tanks and tank cars are unnecessary, a fact which eliminates one important factor of loss and danger. Layouts can be so arranged as to place a considerable portion of the pipe under less than atmospheric pressure, again reducing leaks and danger, because LaBour Pumps can *lift* the liquid. Since there need be no flow to the pump, pressure is removed from the packing gland, a fact which still further reduces hazard.

Consider these facts carefully. Remember that LaBour Pumps are available in various corrosion-resistant materials, and that they are so simply constructed that there is but a single moving part. You should investigate what LaBour Pumps can do for you.

THE LABOUR COMPANY, INC.
607 Sterling Avenue
ELKHART, INDIANA

LA BOUR PUMPS
NEVER LAY DOWN ON THE JOB

NO NEED TO LINE UP FLANGES

WITH NAVCO WELDING STUBS

No longer is it necessary to use a solid welding flange wherever a flanged connection is required in welded pipe lines. The new Navco Welding Stubs are now available in a complete range of sizes from ½" to 24" and for all operating conditions. • With their loose flanges, they entirely eliminate the lining up of bolt holes, one of the most troublesome and costly operations necessary where solid welding flanges are use. • They are fabricated and machined with the greatest of care and accuracy and provide a permanent and trouble proof connection for almost every kind of service. • Whether you are installing a long gas main or making repairs to a leaky joint, Navco Welding Stubs will materially reduce erection and maintenance charges. Write for details and prices.

NATIONAL VALVE & MFG. CO.

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PIPING SERVICE
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PITTSBURGH, PA.
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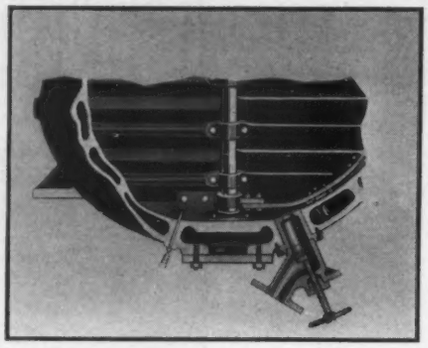
DOPP GREASE KETTLES

ARE COMPLETE. EVERY LABOR SAVING DETAIL IS INCLUDED

Use This "Check List" to Compare Grease Kettles— Open or Pressure Types

1. Will these Grease Kettles mix quickly and will they rub out lumps?
2. Will they heat or cool grease materials quickly?
3. Will they stand alternate heating and cooling?
4. Can grease temperatures be taken accurately and continuously without stopping the Agitators?
5. Are these Kettles easy to clean? Can they be used week after week without stopping production for cleaning?
6. ★ Do the outlets close flush with insides of Kettles, without pockets of unmixed materials or old grease to be dug out?
7. Can these Kettles be insured? At desired working pressure?
8. Will their yearly depreciation be a small item, due to their long life? Is their maintenance negligible?
9. Are these Kettles guaranteed? For life?
10. Are other grease companies using these Kettles? With entire satisfaction?



For example, consider outlet for contents. With the ordinary kettle there is a pocket at the outlet 6″ to 8″ deep, extending from the inner kettle surface to the discharge valve below the jacket. To prevent material accumulating here, the usual practice is to pack this pocket level full with old heavy grease or soap before the fats, oils, etc., are put into the kettle for making a batch of grease.

After the batch has been completed this plug of old grease must be removed and put to one side to be worked over with a later batch. When the weight of the finished grease in the kettle is not sufficient to force the plug out of the pocket, the operator must reach up through the open gate valve and with a knife cut the plug loose, quickly get his arm and knife out of the opening, catch the plug and the grease which comes through with it in a suitable container, and then close the valve and arrange for drawing off the remainder of the batch.

Dopp Grease Kettles equipped with Style "J" "Cast-Thru" Outlets which close flush with inside of kettles eliminate all this time-wasting extra work, for there are no pockets which must be filled up with old grease. When this outlet is closed the face of the outlet disc comes flush with the inner kettle surface. When the batch is finished, this disc is screwed down completely out of the way leaving an unobstructed opening for the discharge of the grease.

Dopp Seamless Kettles make possible alternate heating and cooling as well as the use of a positive scraping type agitator resulting in quicker heating or cooling. These and the other points brought out in the check list applying to both open kettles and pressure mixers will be answered in full upon receipt of your request.

SOWERS MANUFACTURING CO.

MANUFACTURERS OF DOPP EQUIPMENT FOR HEATING, COOLING AND MIXING

1292 NIAGARA ST., BUFFALO, N. Y.

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NEW! » » »

ALLOY STEEL EQUIPMENT

» » » for worst corrosive conditions

Now . . . many difficult corrosion problems have been solved for you . . . by the new Alloy Steel Pumps, Valves and Special Castings developed by Duriron engineers.

This new Alloy Steel Equipment is highly resistant to weak sulphuric acid, acid sludges, sulphur-bearing oils, hot or cold . . . as well as to caustics and other vicious solutions. And back of it is the nearly 20 years' experience of the Duriron organization in combatting corrosion.

The great resistance possessed by this equipment is due to low carbon content (.04% to .07%), obtained only with high frequency induction furnaces, which we have in our foundries.

The new pumps are centrifugal, either standard or self-priming. Y Valves are of several sizes. Special equipment is made to your design. Write for bulletins.

THE DURIRON COMPANY, INC.

412 N. Findlay St., Dayton, Ohio

DURIRON

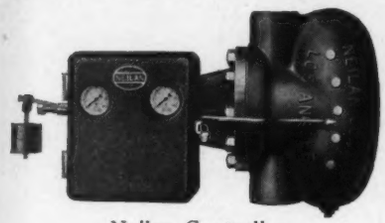
New No. 15 Centrifugal, Self-priming Alloy Steel Pump by Duriron. 2 inch suction, 2 inch discharge. Up to 52 ft. head. Other sizes, standard or self-priming.

New Equipment for the Modern Plant

1. Liquid Level Controller

NEILAN COMPANY, LIMITED

Neilan Company, Limited, 641 Santa Fe Avenue, Los Angeles, California, this year put on the market an instrument type liquid level controller which has been developed for the purpose of controlling the levels of liquids of high gravities, especially liquefied propane and butane.



Neilan Controller

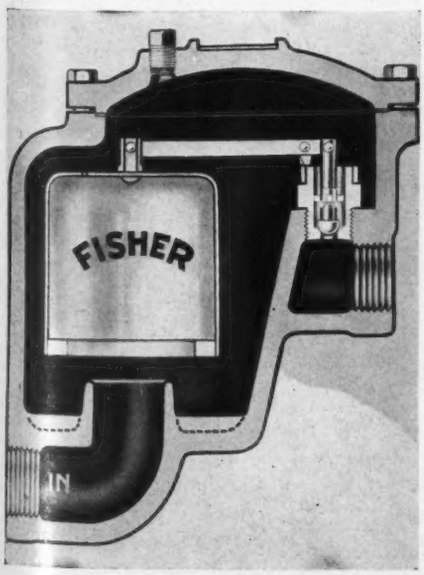
Because of the sensitiveness of the controller, only a six-inch float is required to provide ample power for maintaining levels in liquids of highest gravities. The instrument is of the pilot operated type and may be used to operate a remotely located control valve.

2. Inverted Bucket Steam Trap

FISHER GOVERNOR COMPANY

Fisher Governor Company, Marshalltown, Iowa, announces Class ST inverted bucket steam trap with such features as an adjustable valve post and a positively guided inner valve.

The body and cover are of semi-steel, the inverted bucket is of heavy gauge spun brass, and the lever and pins are of stainless steel, valve and orifice seat are of heat-treated stainless steel. The valve post has a special adjustment for ease of setting when replacing parts. Pipe connections are horizontal with vertical offsets.



Fisher Steam Trap

Internal Safety Valve

3. Internal Safety Valve

SHAND & JURS COMPANY

Shand & Jurs Company, Berkeley, California, announce an internal safety valve for providing additional protection to the outlet and inlet lines of oil reservoirs. It is controlled remotely by a winch on top of the reservoir, or carried over to a safe distance from it by cable connections.

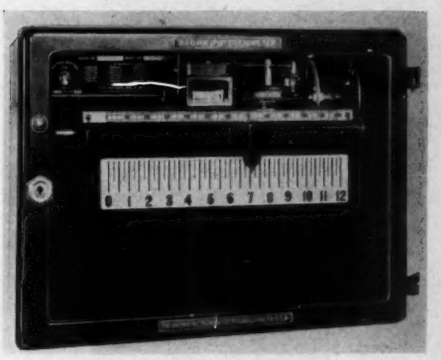
The valve has two covers, one small and one large. The small one is permitted to open first, to balance the pressure and thus permit the opening of the larger valve easily. The cable can be so arranged with fusible connections so that in the event a fire should occur when the valve is open, the valve will automatically close. A large ring at the top is provided for a fishing job in the event that the cable should become broken or not available. The ring can be easily located with a hook, should this be necessary.

4. Potentiometer

BROWN INSTRUMENT COMPANY

Brown Instrument Company, Philadelphia, Pennsylvania, announces a new indicating potentiometer of the self-balancing type.

Aside from the main design feature, manufacturers of the new indicating potentiometer claim such advantages as an unusually long (40-inch) slide wire, positive spiral shaft drive, a non-slip clutch, a secondary pointer definitely fixing the size of step in moving the slide wire contact, interchangeable case for universal mounting, mechanism swings out of case for easy inspection without interference with operation, mercury-in-glass switches in control models, automatic thermal equalization between cold junction terminals and compensation coil.



Brown Potentiometer

A very apparent feature is the big scale with large figures, calibration marks and pointer; making accurate reading easy at a considerable distance. As a pyrometer this instrument can be supplied for any range from 0 to 100° F. up to 0 to 3000° F. or for almost any span between these ranges. Models for automatically controlling as well as indicating temperatures can be furnished.

— — — — — — — — ***MAIL COUPON*** — — — — — — —

REFINER AND NATURAL GASOLINE MANUFACTURER,
Houston, Texas, U. S. A.

Please see that I am supplied, without obligation, additional information on New Equipment Items Nos.....described in June 1932, issue of REFINER.

Name.....

Company.....

Address .....

New Equipment for the Modern Plant

5. Combustible Gas Indicator

MINE SAFETY APPLIANCES COMPANY

Mine Safety Appliances Company, Braddock, Thomas and Meade Streets, Pittsburgh, Pennsylvania, announces a new portable, conbustible gas indicator for testing explosive gas hazards.

Gas Indicator

The instrument is direct reading and is designed to quickly and accurately sample and test flammable vapor-air mixtures for explosibility. It is adaptable for use on gasoline and oil storage tanks, oil tankers, manholes, along pipe lines and on liquid storage vats.

6. Oil Still Control Valve

LUDLOW VALVE MANUFACTURING COMPANY

Ludlow Valve Manufacturing Company, Troy, New York, announces the new oil still control valve, made in sizes of three-inch and four-inch, for 1000 pounds pressure at 900°, a valve used to control the still pressure.

Due to the high temperature there is great difficulty with coke formation inside the valve, the manufacturers state, explaining that the packing of gate valves with coke results in poor valve operation. Thus it is important that this valve remain in condition to be opened to prevent pressure in the still.

The Ludlow multi-stage has a proper flow characteristic for this work and when made with the "plunger' type valve stem there is no valve head and pocket to prevent opening. The cooling chamber is supplied with cool oil that sweeps through the opening between stem and body thus preventing coke from forming on the stem.

The manufacturers describe the Ludlow multi-stage cone as affording a metal-on-metal seating that cuts through scale and viscous liquids and gives a shut-off that will not simmer; also a multi-stage opening action that reduces velocity and density by successive expansion and cushioning, offering a perfect throttle without erosion, and further offers a multi-seat principle that allows a tight seal with all fluids, at all temperatures and pressures.

7. Gate Valve

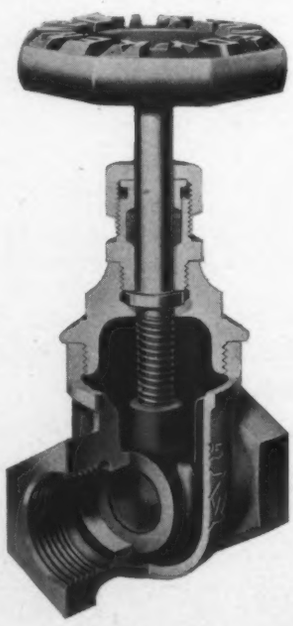
KENNEDY VALVE MANUFACTURING COMPANY

Kennedy Valve Manufacturing Company, Elmira, New York, has placed on the market a new Standard bronze solid wedge stationary stem gate valve for 125-pound steam pressure and 175-pound water pressure.

One of the features of this valve is the extra large bonnet hex which is placed close to the hub face joint where it screws into the body. This construction makes the valve particularly rigid and also assists in removal of the bonnet and stem assembly when the valve is placed where clearances for installation are close.

Another feature is the extreme depth to which the stem engages with the disc, providing a large number of contact threads which practically eliminate possibility of stripping. Special attention has also been given to the design of the pipe end hexes which are made heavy, with a large number of threads for tightness of pipe end connections without make-up strains on pipe or valve. The stuffing box is provided with gland on all sizes and the packing rings are of molded square section and made of a composition which has a high graphite content.

Weights of all sizes meet United States government specifications.

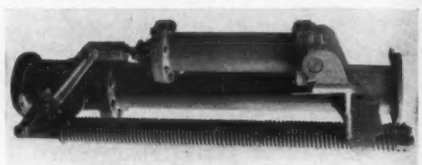


Kennedy Valve

8. Shut-Off Valve

SHAND & JURS COMPANY

Shand & Jurs Company, Berkeley, California, announces a steam operated automatic shut-off valve for flue gas systems for use on tanks, the valve being placed in the flue gas line. It automatically closes if either cooling water or ejector of steam fails.



Shand & Jurs Valve

Use of such a valve has been found necessary in a properly designed flue gas system, according to the manufacturers, to assure the proper functioning of the system, and it is an added factor of safety—being an effective preventive of fire hazard.

9. Pilot Valve

FISHER GOVERNOR COMPANY

Fisher Governor Company, Marshalltown, Iowa, announces development of the Series 4200 Wizard pilot unit which involves a design that includes the pilot valve as an integral part of the main valve top work. This unit utilizes auxiliary air or gas as an operating medium and is suitable for all pressure conditions of five pounds and up.

The unit is easily converted from a pressure reducing valve to a pressure relief valve by a very simple change made in the pilot valve. It is furnished complete with a small auxiliary regulator and pressure gauge.

This unit is being used in refinery operations where close limits of regulation must be maintained. With the new design incorporating the pilot with the main valve, the elimination of time lag has been accomplished, making the valve immediately responsive to the slightest command of the pilot.

ITEMS ABOUT MANUFACTURERS

Alco Products, Incorporated, 220 East 42nd Street, New York, New York, has received an order from the Argentine Government Oil Fields for two complete refinery units to be used for the production of a variety of lubricating oil fractions from reduced crude. The units will be installed in the La Plata refinery in Buenos Aires. The capacity of the one will be 2300 barrels a day, and of the other, 2200 barrels a day. The units are being fabricated at the Dunkirk, New York, plant of the American Locomotive Company and are expected to be delivered within about four months.

B. V. Emery Company, Tulsa, Oklahoma, announces that for a year it will continue to push sales of Merco-Nordstrom valves in the Tulsa territory, but that trade communications would be expedited if future matters be addressed direct to Merco-Nordstrom Valve Company, P. O. Box 1807, Tulsa, Oklahoma.

J. A. Campbell Engineering Corporation, enlarged successor to J. A. Campbell Company, has leased new offices at 973 North Main Street, Los Angeles, where the concern will have access to one of the most complete machine and plate shops in Southern California.

The principals of the new organization are Henry N. Wade and C. L. Parkhill, both of whom have been identified with the Campbell organization for many years and are experienced in the design and construction of natural gasoline plant equipment, scrubbers and other units necessary in the production of casing head gasoline.

J. A. Campbell, one of the originators of the bubble-tower principle of gasoline absorption, will be indirectly identified with the new organization in a consultant capacity, but will devote the major portion of his time at the old location in Long Beach where he will further develop several gas and power specialties, principal of which are the Daniel orifice fitting and the Volz steam-water liquid level control.

Stearns-Roger Company of Denver will continue to have charge of the sales and construction of Campbell absorption plants, absorbers, and Mist-D-Fiers in the Mid-Continent field.

Greene Brothers of Wichita Falls, Texas, announce removal of their headquarters to 1812 Griffin Street, Dallas, Texas, where a stock of chemicals, laboratory supplies and refinery and gasoline plant specialties will be carried. The Wichita Falls office, 620 Ohio Street, will be maintained as a stocked branch office.

Shand & Jurs Company, Berkeley, California, announce the appointment of Ralph H. Smith as exclusive representative for Southern California with offices and warehouse at 1333 Santa

The Arco Company, Cleveland, Ohio, announces appointment of O. N. Edgar of Houston as district manager in charge of sales and distribution of paints. Mr. Edgar, who maintains offices at 1506 Second National Bank Building, Houston, formerly was the southwest representative of Detroit Graphite Company.

Homestead Valve Manufacturing Company, Coraopolis, Pennsylvania, has announced appointment of Lietz Engineering Company, 2354 Lincoln Avenue, Chicago, as exclusive representative for the Chicago district.

Economy Electric Lantern Company, 325 West Huron Street, Chicago, announces appointment of H. C. and L. M. Gardner, 2227 Warner Road, Fort Worth, as representatives for Texas, Louisiana, Arkansas, and New Mexico, and the appointment of W. L. Walker Company, 800 South Main Street, Tulsa, as representative for Kansas and Oklahoma.

Shand & Jurs Sales Company, Denver, Colorado, announces appointment of Harvey D. Crawford as division manager in charge of the New York office, 60 East 42nd Street. Mr. Crawford formerly was connected with the refinery sales division of Johns-Manville, New York.

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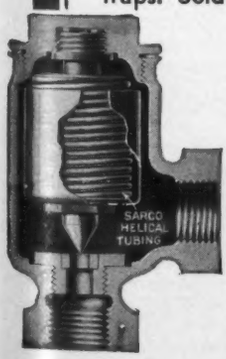

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High Volume Pumps

Worthington Pump and Machinery Company, Harrison, New Jersey, has for distribution Bulletins D-111-S4, D-111-B2, D-111-B3, D-111-B4, and D-111-B5, all devoted to description of high volume designed for highly volatile liquids.

Compressors

General Electric Company, Schenectady, New York, has ready for distribution the following recently issued bulletins: GEA-1344A, single-stage centrifugal compressors; GEA-1542, Type B direct-current motors; 301-106, thrustors.

Sulphuric Acid

The International Nickel Company, 67 Wall Street, New York, has released for distribution a 12-page, illustrated bulletin titled "Sulphuric Acid Versus Metals" dealing with corrosion, Hydrogenion concentration, film formation, uses of sulphuric acid, and related topics.

Water Level Recorders

Bailey Meter Company, Cleveland, Ohio, has released Bulletin No. 112, printed in two colors, which outlines the advantages, the mechanical construction, and various methods of installation of the Bailey Boiler Water Level Recorder. It describes the method for obtaining records of the true water level throughout the full range of the drum. Illustrations are included showing installation photographs and reproductions of actual chart records.

Heat Exchangers

Henry Vogt Machine Company, Louisville, Kentucky, has published Bulletin HE-2 describing various types of heat exchangers, including shell and tube and multiple pipe exchangers. The illustrated Bulletin lists the features of the design and the services for which the exchangers may be used.

Pilot Valves

Fisher Governor Company, Marshalltown, Iowa, recently released for distribution Bulletin No. 70 describing Series 4200 Wizard Pilot Unit, for use where close limits of regulation must be maintained.

Controllers

C. J. Tagliabue Manufacturing Company, Brooklyn, New York, recently published Bulletin No. 1024 describing a new TAG steam operated controller featuring a new control head which houses the control port and the thermostatic bellows.

Filter Presses

T. Shriver & Company, 864 Hamilton St., Harrison, New Jersey, has prepared Catalog No. 29, presenting information concerning its line of filter presses, including diagrams of various types of filtering installations and general engineering data on the subject. Information dealing with the company's filter cloths, diaphragm, duplex and triplex pumps, and hydraulic equipment is also included.

Recording Gauges

The Bristol Company, Waterbury, Connecticut, has issued catalog No. 1011 describing absolute pressure gauges of the direct reading type, with particular detail on Model 35 recording absolute pressure gauge for wall mounting and Model 35F for flush mounting.

Glass Filters and Apparati

Fish-Schurman Corporation, 230 East 45th Street, New York, has published for distribution a 12-page, illustrated catalog, No. 230E, describing and giving prices on Jena glass filtering crucibles, filter funnels of various types, micro-filters, filter apparatus for gas, gas washing bottles, filters for special extension work, and miscellaneous gas apparati for laboratory and field use.

Welded and Brazed Joints for High Nickel Alloys

The International Nickel Company, 67 Wall Street, New York, has had reprinted the paper and illustrations on gas welded and brazed joints for high nickel alloys prepared jointly by F. G. Flocke, J. G. Schoener, and R. J. McKay and presented before the thirty-second annual convention of the International Acetylene Association in Chicago in November.

Magnetic Switches

General Electric Company, 1 River Road, Schenectady, New York, has released for distribution to interested parties Bulletins Nos. GEA-19G, GEA-1565, GEA-1587, and GEA-1588, describing and illustrating various types of magnetic switches for use in the production and refining branches of the oil industry.

Plug Cock Valve

J. E. Swendeman, Incorporated, 171 Camden Street, Boston, Massachusetts, has for distribution a bulletin describing the new Swendeman rotary valve, rather revolutionary in design, permitting the valve to rotate on its seat, not off of it, and eliminating the necessity of a lubricant.

Boilers

Foster Wheeler Corporation, 165 Boardway, New York, has a handsome 48-page, illustrated catalog describing verbally, pictorially, and with mechanical drawings, various type of boilers manufactured by the corporation. Among the types displayed in Bulletin No. B-32-3 are: four-drum, bent tube type; three-drum, bent tube type; straight tube, sectional header; three-drum, low head; two-drum, low head; three-drum, A type marine; straight tube, cross drum marine; fire tube; and waste heat boilers used as mufflers.

Compressed Air Aftercoolers

Schutte & Koerting Company, Philadelphia, Pennsylvania, has published Bulletin No. 12-G, Supplement 1, compressed air aftercoolers. The bulletin is illustrated with section and profile drawings.

Steam Trap

Fisher Governor Company, Marshalltown, Iowa, has for distribution Bulletin ST-10 describing that company's new Class ST inverted bucket steam trap which features an adjustable valve post and a positively guided inner valve.

Pumps

Northern Pump Company, Minneapolis, Minnesota, has released Bulletin PX4 describing the Series XE Nitralloy Steel pumps with capacities ranging from 6 to 42 gallons per minute and for use in handling all types of oils.

Exhaust Fans

Duriron Company, Dayton, Ohio, has published Bulletin No. 166, A. I. A. file No. 30dl, on acid resisting exhaust fans, with outlets varying from three to 16 inches. The bulletin is illustrated with photographs and drawings and carries a number of 70° air capacity tables.

Generators and Exciters

General Electric Company, Schenectady, New York, has released Bulletin GEA-1607, superseding GEA-433A and devoted to direct current generators and exciters. Structural details of the generators and exciters are illustrated with photographs and mechanical drawings.

Lead Pipe

Lead Industries Association, Graybar Building, 420 Lexington Avenue, New York, has for distribution a 24-page illustrated book called "Lead Pipe" which describes the manufacturing process of lead pipe and outlines industrial uses for same. New standards for lead pipe sizes and weights adopted by manufacturers are tabulated in the book.

Screw Pumps

Quimby Pump Company, 340 Thomas St., Newark, New Jersey, has prepared for distributing to those interested in pumping problems, Bulletin No. S-104, describing in technical form the Quimby Screw Pump, its construction, operation and maintenance. Diagrams and charts are used to illustrate the discussion.

Baffle Wall

Boiler Engineering Company, 744 Broad Street, Newark, New Jersey, has a six-page, illustrated folder titled "The Reco-Turner Baffle Wall" setting forth how boiler efficiency and capacity have been increased by proper baffling.

Graphite

Acheson Oildag Company, Port Huron, Michigan, has released a 24-page booklet describing colloidal graphite, its properties, uses and advantages as a lubricant.

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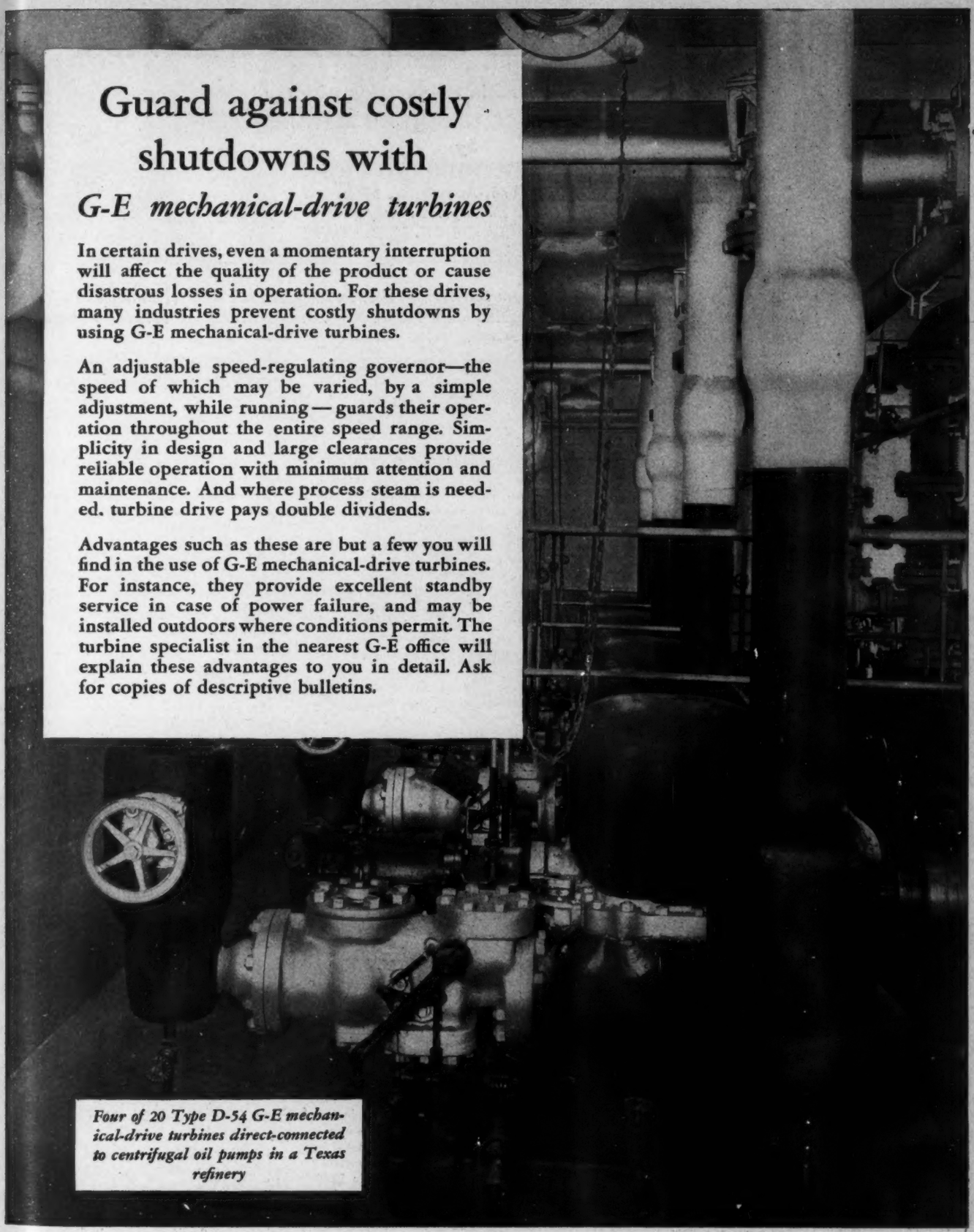

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The abstracts here presented are selected from the current literature of science and technology to afford reference to fundamental information not easily available to all readers. Abstracts of articles appearing in readily obtainable trade journals are not included.

Photostat copies of original articles will be supplied at cost by the Leslie Laboratories. Complete or limited bibliographies covering special topics by title, by abstract, or in complete manuscript, will also be prepared and furnished at reasonable cost by the Laboratories.

Fundamental Physical Data

Pressure-Volume-Temperature Relations of Paraffin Hydrocarbons. G. G. BROWN, M. SOUDERS and R. L. SMITH. *Ind. Eng. Chem.* **24** (2932) pp. 513-15.

The wide divergence of the P-V-T relationships of hydrocarbons, under such conditions as exist in equipment used in natural gasoline manufacture and refinery vapor recovery, from those predicted by the laws of ideal gases, is pointed out. Using data from the literature a method of determining these deviations is presented.

Fugacities of Paraffin Hydrocarbons. C. W. SELHEIMER, M. SOUDERS, R. L. SMITH and G. G. BROWN. *Ind. Eng. Chem.* **24** (1932) pp. 515-7.

The effect of pressure on the vapor pressure of a liquid is reviewed and the fugacities of hydrocarbon vapors and liquids, based on data from the literature, calculated and presented in chart form.

Equilibria Between Liquid and Vapor Solutions of Paraffin Hydrocarbons. M. SOUDERS, C. W. SELHEIMER and G. G. BROWN. *Ind. Eng. Chem.* **24** (1932) pp. 517-9.

Henry's, Dalton's, and Raoult's laws are reviewed and the fact noted that the application of these laws at higher pressures may lead to serious errors. The ratio of the mole fraction of a component in the vapor phase to the mole fraction in the liquid phase is defined as the "equilibrium constant". Calculated values of this constant as a function of temperature and pressure are presented in graphical form.

Vapor Pressures and Latent Heats of Vaporization of Hydrocarbons. J. B. MAXWELL. *Ind. Eng. Chem.* **24** (1932) pp. 502-5.

Vapor pressure data on the paraffin hydrocarbons above propane were correlated by plotting the reciprocals of the absolute temperatures against those of hexane, at the same vapor pressures. The lines so determined are straight lines intersecting at a point. The average deviation of reliable data from isobutane through nonadecane is less than 1°F. Since no data on critical temperatures above octane were available, a relationship was developed for use in extrapolation. The relationship between log of boiling point and log of critical temperature plus 150 is linear. Critical temperatures up to nonadecane were thus determined. A relationship between the latent heats of hexane and those of other hydrocarbons, under various conditions, was developed by use of the exact Clapeyron equation, the vapor pressure equation, and the deviations of the saturated vapors from the ideal gas laws. It was found that the ratios of the latent heats of any hydrocarbon to the latent heats of hexane are constant at the same reduced pressure. The average deviation for variety of hydracarbons up to octane was 1%. This relationship applies to other substances than hydrocarbons, such as alcohols and water, so that if the latent heat at any vapor pressure and the critical temperature of a substance are known, latent heats at other vapor pressures can be determined.

Chemical Composition and Reactions

The Identification of Mercaptans with 2, 4—Dinitrochlorbenzene. R. W. BOST, J. O. TURNER and R. D. NORTON. *Jour. Am. Chem. Soc.* **54** (1932) pp. 1985-7.

The reagent suggested is stable, inexpensive, and gives solid derivatives that are readily identified by their m.p. and by oxidation to the corresponding sulfones.

The Heat Treatment of the Hydro-Carbons with Special Reference to the Gaseous Hydrocarbons. A. E. DUNSTAN, E. N. HAGUE and R. V. WHEELER, *Jour. Soc. Chem. Ind.* **51** (1932) pp. 131T-33T.

In the polymerization of ehtylene and other olefines the temperature required is moderate (380° C up to 550° C max.), thus eliminating the necessity for special steel tubes. Pressure is advantageous. The products can be regulated by the choice of conditions and may be anything from gaseous higher olefines to synthetic lubricating oils. Carbon deposition must be avoided by choice of material in contact with the reacting gases as carbon acts auto-catlytically in decomposing the hydrocarbons. Yields approach the theoretical under proper conditions. Spirit of high anti-knock value can be made.

Composition of Straight-Run Pennsylvania Gasoline. II—Fractionation and Knock Rating. M. B. FENSKE, D. QUIGGLE and C. O. TONGBERG. *Ind. Eng. Chem.* **24** (1932) pp. 542-6.

Pennsylvania straight-run gasoline was separated into fractions of alternate high and low knock ratings. These differences in knock rating correlate with chemical composition in terms of paraffine, naphthenes, and aromatics. Individual normal paraffin hydrocarbons are present to the extent of 2-5% in this gasoline, and all such hydrocarbons together constitute approximately 20% of the gasoline and are responsible for its bad knocking property.

A New Autotrophic Bacterium Which Oxidizes Directly to Nitrate and Decomposes Petroleum. C. B. LIPMAN and L. GREENBERG. *Nature* **129** (1932) pp. 204-5.

The new bacterium described oxidizes ammonia directly to nitrate. Petroleum is decomposed by it to carbon dioxide without formation of other gases.

The Homogeneous Combination of Ethylene and Hydrogen. R. N. PEASE. *Jour. Am. Chem. Soc.* **54** (1932) pp. 1876-82.

Ethylene and hydrogenn reacted in a Pyrex glass vessel at 475-550°C. and one atmosphere pressure. The reaction is homogeneous and of the second order. Calculation indicates that approximately 10% of the collisions between ethylene and hydrogen molecules are sufficiently energetic to result in combination to ethane. The equilibrium constant calculated from the rates of formation and dissociation of ethane is in good agreement with that found by direct measurement.

Manufacture: Processes and Plant

Refining in Asia. C. E. SPEARING. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 269-72.

A review of the industry in Asia. Progress has followed normal lines. Additional cracking equipment has been built in response to an increasing demand for anti-knock gasoline. Pipe-still distillation has been generally adopted. Uninsulated floating roof tanks have proved most satisfactory in Persia. Crude stabilization is practiced to reduce storage losses. Distillation in the oil field is practiced by Anglo-Persian to make products desired in quantity at the moment and to return the unwanted portion of the crude into the wells with beneficial results. A number of liquid sulfur dioxide kerosene treating plants have been built. Bauxite is used as a finishing treatment on many products and is revivified in situ by use of highly superheated

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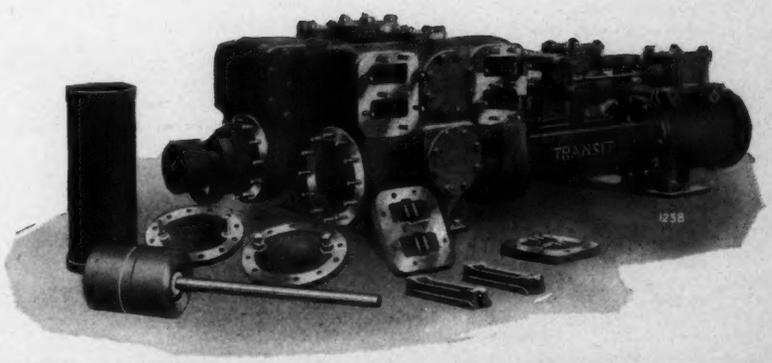

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steam. Dry air is required in this treatment and can be obtained only by refrigeration which is a limitation in many instances. Anglo-Persian has adopted the Alanmor stove for all wax-sweating. A 30-ton vanadium catalyst oleum plant was built at Abadan. Oxidation of mercaptans with air in presence of lead sulfide has been found more economical in treating the less volatile distillates than doctor treatment.

Heat Transmission in the Radiant Sections of Tube Stills. D. W. Wilson, W. E. Lobo and H. C. Hottel. *Ind. Eng. Chem.* **24** (1932) pp. 486-93.

The empirical formulas for predicting heat transfer in the combustion chambers of boiler furnaces are reviewed. Twelve tube still furnaces of widely different types are described and the results of 62 performance tests are given. Furnaces operating with and without pre-heated air, with and without recirculation of flue-gas, fired with gas and with oil, and with a wide range of excess air are included. Equations are given for the calculation of the fraction of the available heat in the fuel that is absorbed in the radiant section.

Heat Transmission in Convection Sections of Pipe Stills. C. C. Monrad. *Ind. Eng. Chem.* **24** (1932) pp. 505-9.

Data from the literature on convective transfer rates are correlated. Test data were taken on several furnaces operating under varied conditions of flue-gas velocity, excess air, and temperature. High velocity thermocouples were used to take gas temperatures. Determined data and calculated data show good agreement. Simplified formulas for calculating the rate of heat transfer and the pressure drop of gases flowing through banks of staggered tubes are given. Gill ring tubes were found to be unsatisfactory.

Distillation and Fractionation Equipment. W. A. Peters. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 314-28.

The development of fractionation since 1925 is briefly reviewed and the reasons for the trends noted. Developments in pipestill heaters and in the design of fractionating towers are discussed and data given. Instruments and controls, pumps, heat exchangers and condensers are briefly discussed. Excellent photographs and valuable data on the performance of pressure distillate rerun units, two-stage atmospheric crude units, topping and vacuum crude units, vacuum flashing units, rerun units for pressed oil and stock solution, topping and viscosity breaking plants, and topping and cracking units are given.

Studies in Distillation. Design of Rectifying Columns for Natural and Refinery Gasoline. W. K. Lewis and G. L. Matheson. *Ind. Eng. Chem.* **24** (1932) pp. 494-8.

The problem of the design of rectification equipment for natural and refinery gases and gasoline is stated and the steps in the solution of the problem outlined. Illustrative calculations are given, using the Hausbrand equation for the calculation of plate-to-plate concentration gradients in the complex solution exactly as in determining these gradients when dealing with binary solutions.

Studies in Distillation. Graphical Method of Computation for Rectifying Complex Hydrocarbon Mixtures. J. Q. Cope, Jr. and W. K. Lewis. *Ind. Eng. Chem.* **24** (1932) pp. 498-501.

A graphical method of calculation of relationships of variables in rectifying columns applied to the separation of complex hydrocarbon mixtures such as natural or refinery gases and gasolines is given. The difference between this problem and that of the similar problem for binary solutions is stated. Raoult's law is assumed to hold. The advantage of the graphical method is that it permits visualizing the phenomena within the column. The method is applicable to system composed of high boiling as well as low boiling components.

Fundamental Design of Adsorbing and Stripping Columns for Complex Vapors. M. Souders and G. G. Brown. *Ind. Eng. Chem.* **24** (1932) pp. 519-22.

A method of design is presented based on an absorption or stripping factor determined in such manner as to be free from the errors introduced by assuming Raoult's law and the ideal gas laws to hold at high pressure.

Fundamental Design of Fractionating Columns for Complex Mixtures. G. G. Brown, M. Souders and H. V. Nyland. *Ind. Eng. Chem.* **24** (1932) pp. 522-27.

The graphical method of column design, applicable to binary solutions, applied to solutions of three or more components. The graphical method is applied to the limiting cases of infinite and minimum reflux. Use is made of the absorption and stripping factor method to determine composition of the products and the number of theoretical plates.

Fractionation of Straight-Run Pennsylvania Gasoline. M. R. Fenske. *Ind. Eng. Chem.* **24** (1932) pp. 482-5.

Equations and relationships for the separation of complex solutions in their components by fractional distillation are applied to a system composed of gasoline hydrocarbons. It is believed that the separation of such a solution can

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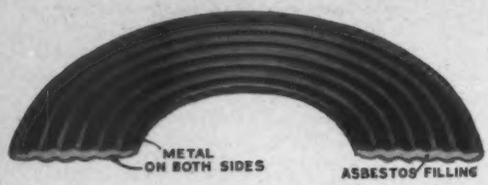

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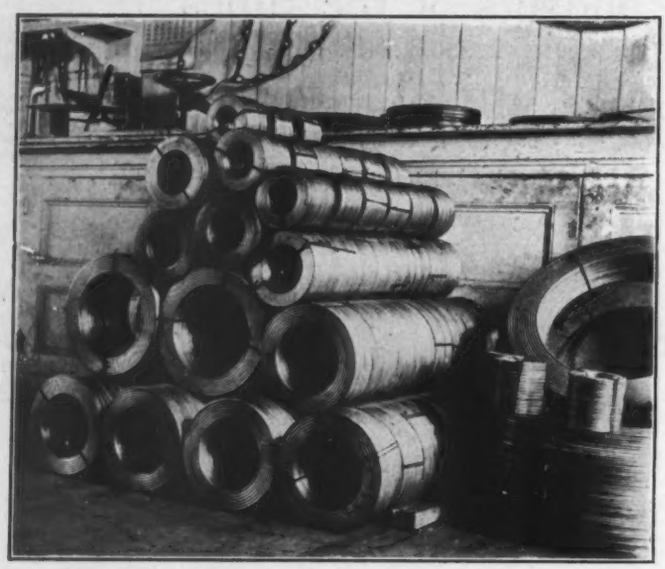

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be treated as the separation of a binary solution of key components using the same ratios for the binary solution as those of the key components in the complex solution. Fractionating columns designed in accordance with these conceptions were found to be effective in the separation of straight-run Pennsylvania gasoline into its component hydrocarbons.

Designing Foundations for Self Supporting Towers. C. O. SANDSTROM. *Chem. & Met. Eng.* **39** (1932) pp. 270-2.

The design of foundations for absorption or fractionating towers that are to be self-supporting is outlined. Square, hexagonal, octagonal, and circular sections are considered, and the octagonal shown to be the best. A typical calculation covering the foundation for a 4 x 50 foot tower is given in detail.

Hydrogenation. A. N. SAKHANOV. *Groznenskii Neftyanik* **1** (1931) No. 4-5, pp. 56-62.

The hydrogenation of petroleum requires temperatures in the range 425-480°C and pressures of 200-250 atmospheres for best results. One per cent of hydrogen is consumed by heavy oils and 0.75 per cent by light oils. Coke is not formed if the operation is properly conducted. A paraffin distillate yielded 45 per cent by weight of gasoline in one treatment and 80 per cent by repeated treatment.

Neutralization of Crude Oils and Their Distillates. P. M. E. SCHMITZ. *Erdol und Teer* **8** (1932) pp. 27-9, 44-7.

The subject of neutralization is treated historically and reviewed in its present technical status. The general conclusion is that it is desirable to neutralize crude oils or distillates to remove naphthenic acids because this leads to economies in soda, in acid, in bleaching earth, and in yields, and also helps to avoid emulsions. The naphthene acids in a Balachany crude are most abundant in the heavy kerosene and spindle oil fractions (about 2.0 per cent). The cylinder oil contains 0.4 per cent and the light kerosene 0.6 per cent. The neutralization should be effected by a dilute soda solution, avoiding too vigorous contacting. Stronger alkali forms emulsions. The presence of naphthene acids interferes in hydrogenation. Also in contact with bleaching earth the presence of these acids results in formation of magnesium salts that decrease the adsorptive power of the earth.

S-D-O, New Corrosion Resistant Coating. O. M. HAYDEN. *Ind. Eng. Chem.* **24** (1932) pp. 563-4.

"S-D-O" is a synthetic drying oil made by the polymerization of divinylacetylene, a by-product in the polymerization of acetylene in the production of duprene. S-D-O films are resistant to the corrosive action of all agents except the strong oxidizing acids and agents. The oil is used in coal tar naphtha solution. The drying of the oil is by polymerization and not by oxidation. In addition to its corrosion resistance it is a valuable damp-proofing coating. Towers and tanks can be made acid and alkali proof by painting with S-D-O.

Products: Properties and Utilization

Gum Stability of Gasolines. J. W. RAMSEY. *Ind. Eng. Chem.* **24** (1932) pp. 539.

The direct relationship between the induction period in the oxygen bomb and the period during which gasoline is gum-stable has been confirmed. These periods were found to be a linear function of the oxygen pressure. The logarithm of the induction period is a linear function of the absolute temperature. A method of extrapolating bomb data to permit predic-

tion of the gum-stability of gasoline under storage conditions is presented.

Relation Between Chemical Structure and Resistance of Fuels to Knocking. A. W. SCMIDT. *Petr. Zeit.* **28** (1932) *Motorenbetr.*, **5** pp. 2-4.

Various substances were added to the extent of 10 per cent to a Russian gasoline (Sp. Gr. 0.741 at 15°C) and the effect on the anti-knock properties determined. Substitution of CH_3-OH, and NH_2 is in the order given in increasing anti-knock value of an aromatic hydrocarbon as an addition. Any two substituted groups are better than one. Unsaturated compounds lose their anti-knock value on storage. The knocking properties of the paraffins depends on the molecular structure. Branching and accumulation of methyl groups on one carbon atom give maximum anti-knock effect. Other open chain compounds such as the alcohols do not give this effect.

Explosions in Gases and Their Kinetics. B. LEWIS. *Chem. Rev.* **10** (1932) p. 49.

The author reviews the work done on explosions in gases and the kinetics of these reactions. The reactions of high velocity, from inflammation to detonation are particularly considered. A bibliography is included.

Technical Lubrication Investigations. O. WALGER. *Z. Ver. deut. Ing.* **76** (1932) pp. 205-8.

Recent studies of plain bearings, taking into account oil viscosity speed, and clearance, indicate that the frictional coefficient can be calculated by a law similar to that of the hydrodynamic-bearing theory. The lowest coefficient is found at the boundary between fluid and semi-fluid friction at high speeds. The coefficient of friction is markedly decreased in the region of semi-fluid friction by use of colloidal graphite. The coefficient of friction of the new fat and oil-free lubricants such as concentrated sugar solutions is favorable.

Oxidation Characteristics of Turbine Oil. C. H. FELLOWS and H. F. SCHNEIDER. *Power* **75** (1932) pp. 49-52.

A laboratory test to determine the oxidation characteristics is described and the results of tests of twelve oils correlated with the value of these oils as determined by actual service.

Lead Oleate-Oil Lubricants, Experiences Therewith Resulting in Explosions. C. G. WILLIAMS. *Mech. Eng.* **54** (1932) pp. 128-9.

Lead oleate, as a component of lubricants used under conditions such that heat developed, exploded violently. The phenomenon is not explained but it is believed that the material is of the detonating type and present only in small quantity.

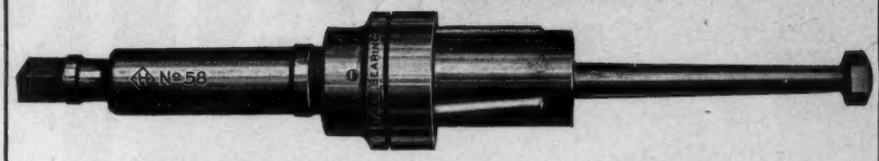
Paraffin Content of Bitumens. RIEHM. *Teer u. Bitumen* **29** (1932) pp. 529-30.

Bitumens that contain 4-5% paraffin expand upon cooling because of the crystallization of the paraffin, and thus form a rough surface. These products are unsuitable for road building and for roofing. The determination of the paraffin content is difficult and no good method is available. The larger the content of paraffin, the slower the hardening and the greater the rate of change of viscosity with temperature.

International Comparison Tables for All Technical Viscosimeters. L. UBBELOHDE. *Erdol und Teer* **8** (1932) pp. 46-7, also *Pet. Times* **37** (1932) p. 200.

The author has been engaged for a long time in the preparation of conversion tables for the Engler, Redwood, and Saybolt viscosimeters. The comparison is to include absolute units. The data will be presented in book form.

Heavy Duty Expanders for Still Tubes



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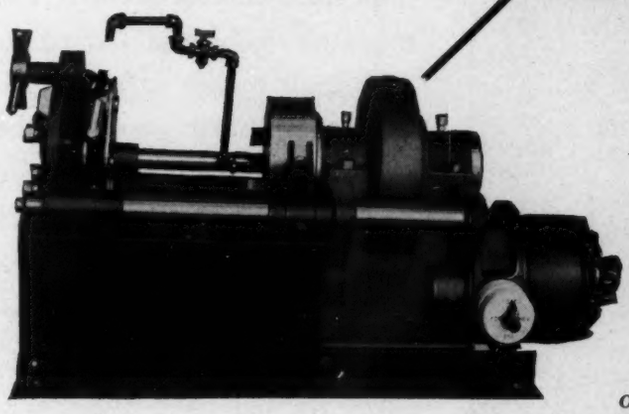

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Universal Atlas Cement Company

Pacific Coast Distributors—Columbia Steel Company, Russ Building, San Francisco, Calif. *Export Distributors*—United States Steel Products Company, 30 Church Street, New York, N. Y.

THE MONTH IN REVIEW

GASOLINE consumption for April and May was higher than the figures estimated by the committee of nine delegated by the American Petroleum Institute. This committee made its report at the mid-year meeting in Tulsa, June 2 and estimated that the decline for the last half of the year would be 6.6 below consumption for 1931. Many private estimates were that the decline would be much greater.

When directors of the Institute met June 20 in New York, Fred Van Covern, statistician for the organization, presented figures to show that the expected decline had not taken place for April and May. For April the consumption was 34,454,000 barrels, against an estimate of 34,250,000 barrels. May consumption was 38,500,000 barrels, while the estimate for that month 37,900,000 barrels.

A. S. T. M. Holds 35th Annual Meeting

NO general statement could better sum up the Thirty-fifth Annual meeting of the A.S.T.M. in Atlantic City over the period of June 20-24, than that of Doctor Zay Jeffries, who in a session of the meeting said, "In my opinion the meeting this year has been marked by the pronounced cooperation of the Society members and groups; the cordiality evident in all of our committee meetings and sessions has been striking and in our work much progress has been made. More than 155 meetings of main and subcommittees were held. Fourteen active sessions were necessary to make room for the 90 papers and reports presented. In addition, two informal conferences were held at which papers giving the importance and application of statistical data were presented.

Doctor Taylor, head of the Princeton University Chemistry Department, in his presentation of the Seventh Edgar Marburg Lecture on "The Problems of Resistance to Deterioration" outlined the tremendous strides made in the determination of speed of chemical reactions which is a major problem in understanding the causes for deterioration of materials and stated his conviction that chemists must devote more time to a study of chemical changes which promote deterioration and must investigate and discover inhibitors.

It was announced that the 1933 meeting would be held in Chicago in June and that the Second Exhibit of Testing Apparatus will be held in conjunction therewith.

Cloyd M. Chapman, Consulting Engineer, New York City, succeeded F. O. Clements, Technical Director, General Motors Research Laboratories, as president.

Italian Cracking Plants Would Double Capacity

OPERATORS of three Italian cracking plants have asked permission to double the capacity of those refineries. One of the plants, located at Spezia, and producing 24,000 tons of gasoline, is owned by Societa Industriale del Petrolio, a wholly controlled Royal Dutch Shell concern. Another is a 22,000-ton unit at Naples, being that of Societa Benzina Italiana, controlled largely by the Compagnie Financiere des Petroles, a French-Belgian corporation also called "Petrofina." The third plant is a 10,000-ton unit at Venice, belonging to the Societa Distillazione Italiana Combustibili, which is Italian owned. Dubbs and Holmes-Manley cracking units are used.

The above three concerns have been granted concessions exempting them for 30 years from payment of import duties on crude oils and for 10 years from payment of taxes on land and buildings as well as equipment. The state in return for the concessions receives 25 per cent of the receipts for the first five years and 50 per cent subsequently after making deductions for depreciation and interest on invested capital at the official rate plus two points. A large number of other similar concessions are under consideration.

A. S. T. M. Committee D-2 Endorses C. F. R. Engine

COMMITTEE D-2 on Petroleum Products and Lubricants accomplished considerable constructive work through committee meetings during the Thirty-fifth Annual Meeting of the American Society for Testing Materials in Atlantic City. There were 63 members present at the main meeting of the committee on Tuesday, June 21.

Technical Committee C on Specifications for Fuel Oils (Including Diesel Fuel) has recommended revisions in the Commercial Standard Specifications for Fuel Oils, subject to confirmation by letter ballot. Cooperation with the Federal Specifications Board was facilitated by the appointment of a small working committee.

Technical Committee D on Stoddard Solvent reported results of additional work carried on at the U. S. Bureau of Standards and elsewhere and service tests are to be carried on in dry cleaners' naphtha corresponding to the following specifications:

	not below 100° F.	
Flash point	10 per cent point	330°F., max.
Distillation	90 per cent point	375°F., max.
	end point	410°F., max.

The D-2 report for this year contains as information a description of a method for determination of knock characteristics of motor fuels. After discussion, Committee D-2 unanimously adopted the following resolution: "Committee D-2 endorses the C.F.R. engine for measuring octane numbers of motor fuels. Procedure conditions, such as engine speed and operating temperature are being studied intensively by the Detonation Subcommittee of the Cooperative Fuel Research Committee in conjunction with road tests. It is expected that results of this work will permit establishment of an A.S.T.M. tentative method of test in the near future. No changes in engine design are anticipated."

The following are the results of the biennial election of officers:

Chairman, T. A. Boyd, General Motors Corp.

Vice-Chairman, T. G. Dolbridge, Atlantic Refining Co.

Secretary, R. P. Anderson, American Petroleum Inst.

Advisory Subcommittee, Harold Farmer, Philadelphia Electric Co.; Frederick Kenney, New York City Central Testing Laboratory; K. G. Mackenzie, The Texas Co.; G. G. Oberfell, Phillips Petroleum Co.; R. M. Wilhelm, C. J. Tagliabue Mfg. Co.

Briefly . . . The New Taxes

EXCISE taxes on petroleum products, parts of the measure by which Congress hopes to balance the budget of the United States, will take effect June 21. Imported oils as well as oils sold domestically are subject to the tax.

It is assumed, although regulations have not been made public, that merchandise in the hands of a distributor prior to June 21 will not be subject to the tax.

Briefly the provisions of the law are:

Import Duties—Crude petroleum one-half cent per gallon, fuel oil derived from petroleum, gas oil derived from petroleum, and all liquid derivatives of crude petroleum, except lubricating oil and gasoline or other motor fuel, one-half cent per

gallon; gasoline or other motor fuel, 2½ cents per gallon; lubricating oil four cents per gallon; paraffin and other wax products one cent per pound. These taxes apply only to importations.

Lubricating Oil—The tax on domestic lubricating oil is four cents per gallon, to be paid by the producer. The act contemplates only one tax and regulations will provide for the sale of oils to compounders that the blender will pay the tax and the refiner will sell it tax free. This applies to domestic sales.

Gasoline—The tax of one cent per gallon shall be paid by the importer or the producer of gasoline, except that the tax shall not apply in the case of sales to a producer of gasoline. A producer is defined as "A compounder or blender and a dealer selling gasoline exclusively to producers of gasoline, as well as a producer."

Report on Progress of Naphthology

"REPORTS on the Progress of Naphthology, 1930-1931," reprinted from the April and May, 1932, issues of the Journal of the Institution of Petroleum Technologists, Aldine House Bedford Street, Strand, London, W. C. 2, England, is available from the Institution, price 10s. 6d. $(2.50.)

Of especial interest to the refining industry are papers dealing with American Refinery Technology; Refining in Asia; Refining in Europe; The Cracking Art in 1930-31; Distillation and Fractionation Equipment; Gasoline and the Gasoline Engine; Gum Formation and Its Inhibition in Motor Spirits; Kerosene and White Spirit; Lubricants; Gas Oils, Diesel Fuels and Fuel Oils; Oil Engines; Asphalts and Road Materials; Special Products; Benzole; Low-Temperature Carbonization and Low-Temperature Tar; Analysis and Testing; Chemistry of Petroleum, and Petroleum in the U. S. R. R. This work will prove a valuable addition to the library of technologists, chemists, engineers and supervisors in the refining industry.

Letters to the Editor

Dear Sir:

I have been so pleased by the excellent appearance and the unusually practical contents of your "Composite Catalog" that I want to write at once and congratulate you upon its production. I am sure I shall find this of great service in presenting the petroleum industry to my students—indeed I may wish to write to you a little later on and borrow from you some of the tracings for flow sheets so that I can have slides made for presentation to my classes and for discussion therein. As probably you are aware, the blue and white flow sheets do not take very well when we try to photograph them for the making of lantern slides.

In closing, I want to say that I have never seen a presentation of any industry put in such good shape as has been done in this Composite Catalog. My experience in teaching tells me that the three things of most importance in any process are, a picture of the plant, a flow sheet, and a description. All three of these you have given in your Process Section.

Yours very truly,

R. NORRIS SHREVE,

Professor of Chemical Engineering, Purdue University, Lafayette, Indiana.

Note: The Process Section of the Composite Catalog of Refinery and Natural Gasoline Plant Equipment was reprinted from the Process Number of Refiner and Natural Gasoline Manufacturer, Vol. 11, No. 2, February, 1932.

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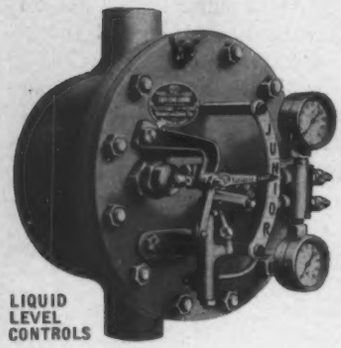

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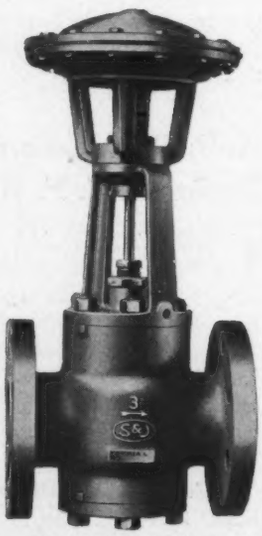

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ROSS H. CAMPBELL

Campbell Operates "Dri-Frost" Plant

ROSS H. CAMPBELL, after attending high school in Pennsylvania, was employed in a Pittsburgh bank, but banking soon became too confining, so he began work in the oil fields of that state. Taking a job with the South Penn Oil Company in 1915, he continued with them until 1919, when he came west to work for Wolverine Oil Company, now a part of the Shell Petroleum Corporation. We was with Mid-Co Gasoline Company for a time in charge of the gas measurement department covering Kansas, Oklahoma and Texas, but in 1921 went with Transcontinental Oil Company in the same capacity. Forming a testing company of his own, he continued to operate testing apparatus until 1923 when he accepted a position with Phillips Petroleum Company in the Burbank field. Remaining with that company until 1925, he went with Skelly Oil Company where he was employed as gasoline plant superintendent at Lyman and later transferred to the Texas Panhandle in charge of the district at Borger. Coming back to Tulsa in 1930, he became associated with the Dri-Frost Corporation and now has charge of the liquid and solid carbon dioxide plant on North Lewis avenue.

Scheumann Supervises Empire Research

IN Okmulgee where Empire Oil & Refining Company has established its general laboratory, W. W. Scheumann takes care of the research and analytical activities covering the several plants of that company.

Previous to his association with Empire Oil & Refining Company, Mr. Scheumann was with Aluminum Company of America as research chemist. He went with that organization immediately after graduating from Purdue university in 1923 with the degree of B. S. in chemical engineering.

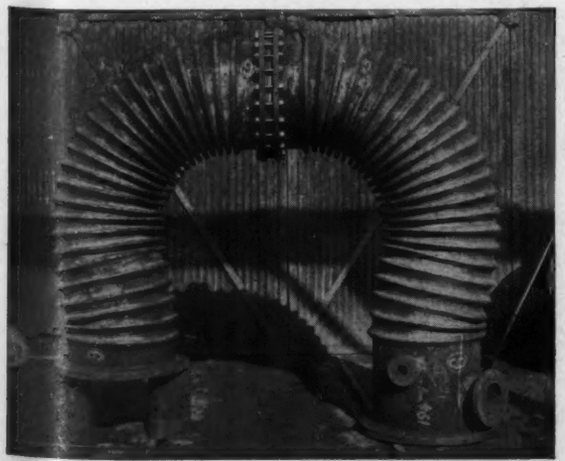
W. W. SCHEUMANN

GEORGE A. JENNINGS

Jennings Experiments With Reforming Units

GEORGE A. JENNINGS, refinery superintendent for the Dale Oil & Refining Company, Electra, Texas, received his first refining experience in 1919, just after he received his discharge from the Air Service at Call Field at Wichita Falls. During his service in the army, George got bit plenty with the air plane bug. However, he does not let that interfere with his business, rather he takes advantage of it in helping it along.

During his connection with this company he has made a lot of experimental runs under varying conditions. He has built several miniture plants in which to solve problems related to cracking and especially reforming of gasoline.



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PLANT ACTIVITIES

Acquisition—Penn-Tex Refining & Producing Corporation, recently organized, to acquire and operate 300-barrel skimming plant erected last summer by Echotex Refining Company, Echo, Texas. Organized by F. W. Snyder, Henry Wittmer, II, and W. M. Reed, to process Coleman County production of Wittmer Oil & Gas Properties.

Operating—Starlight Refining Company, a new concern healed by Geo. A. Sonricker, is operating a 1000-barrel skimming plant, Breckenridge, Texas.

Refinery—Imperial Oil, Ltd., building small refinery, Fort Norman field of northern Canada, to operate on crude from that field supplying fuel for mines and gasoline for Mackenzie River boats. Ronald W. McKinnon, charge of construction and operation.

Confirmation—Shell Oil Company of Canada, through President P. M. Fowlie has confirmed East Montreal refinery construction reports, investment over $2,000,000.

Refinery—Shell Oil Company of British Columbia, Canada, has started construction of Van Couver, British Columbia refinery, first unit, 2500 barrels, to be complete by fall. W. N. Thompson, chief engineer, C. E. Frisholz, in charge of construction. Follows announcement of Shell Oil Company of Canada to erect refinery at Montreal, East Quebec. Both plants estimated cost, $1,000,000 each.

Crude Oil Unit—Quaker State Refining Corporation, Oil City, Penna (formerly operated as Independent Refining Company) contract to Foster Wheeler Corporation, erection of 2500-barrel crude oil distillation unit.

Enlarging—Wirt Franklin Petroleum Company adding three 200 horsepower Clark compressors, Lowery plant, Oklahoma City field, enlarging equipment one-third, R. R. Owens, general superintendent.

Gasoline Plant—Excelsior Refining Company (organized by W. L. Morgan and associates) to erect 4,000,000 cubic foot gasoline plant, Ward Oil Company's Giles lease, M. J. Pru survey, Rusk County, East Texas.

Cracking Unit—The Pennzoil Company, Oil City, Pa., erecting 3000-barrel Dubbs cracking unit for naphtha cracking. Arthur G. McKee & Company, building. Estimated cost, $250,000.

Refinery—Vacuum Oil Company awarded contract for construction industrial building, sewers, etc., at Havre, France, to Foundation Company, estimated cost, $400,000. Other contracts awarded.

Refinery—Pure Oil Company at Midland, Michigan, progressing satisfactorily with construction of 5000-barrel refinery. C. M. Ridgeway, formerly with Old Dutch Refining Company, Muskegon, selected as superintendent.

Cracking Unit—General Petroleum Corporation will erect 6000-barrel cracking unit at Torrance, California, type not reported; estimated cost approximately $1,000,000.

Acquisition—Chemical Research Corporation, Pure Oil Company, and Gyro Process Company have made agreement with Alco Products, Inc., whereby the latter concern through transfer of stock in American Locomotive Company and cash consideration, assumes management of future engineering, development, and licensing of Gyro process.

Reorganization—Cosden Oil Company stockholders have deposited claims in favor of reorganization of the company, according to reports from New York. Company has refinery, producing and pipe line properties in West Texas.

Refinery—HiWay Refineries, Ltd., Regina, Saskatchewan, Canada, will build small refinery at Saskatoon, Sask. Company plans erection of other small plants in western Canada.

Plant Purchased—Caminol Oil Company, Ltd., Los Angeles, has purchased 2500-barrel skimming plant of Kettleman Hills Gasoline Company, Hanford, Calif.

Operating—Midland Oil Refining Company is operating 1000-barrel refinery at Denver, Colorado, and announced that a new 1000-barrel unit will be erected when marketing conditions warrant. Officials are L. M. Hines president, M. B. Johnson, vice president, Perry Brooks, secretary, Ira C. Baugh, treasurer, Clifford Messenger, purchasing agent, L. R. Hines, sales manager, and V. C. Buckhard, superintendent. (Ref. & N. G. M., May, 1932, page 71-A.)

Refinery—H. C. Karels and R. E. Karels, Regina, Saskatchewan, Canada, building small skimming plant at Regina. Reported cost, $25,000.

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Refinery—Modern Oil Supply Company building a small skimming plant at Greybull, Wyoming. J. C. Jackson is manager.

Refinery—Magdalena Syndicate Corporation, purchaser of German acreage, announced plans for German refinery of 5000-barrel capacity, indefinite maturity.

Refinery—Cedar Grove Refining Company, headed by Gene Griswold, leased part of D'Artois Refining Company, plant, Cedar Grove (near Shreveport, Louisiana) installing 500-barrel skimming plant—not interfering with operation of D'Artois lubricating oil plant.

New Unit—Pure Oil Company at its 30,000-barrel Nederland (Smiths Bluff), Texas, refinery, is adding new 6000-barrel distillation unit. Contract to Alco Products, Inc.

Operating—Valley Refining Company, McAllen, Texas, (W. K. Campbell, Roy B. Jones, J. E. Campbell) operating new 500-barrel skimming plant. J. F. Ryan, superintendent. (Ref. & N. G. M., May, 1932, page 61-A.)

Russian Program—U. S. R. R. will extend refining during next five years mostly in cracking. Plan 220 new cracking units, of which 130 to be vapor phase and 90 liquid phase, affecting plants at Baku, Batum, Tuaspe and Grozni. Building to be concentrated along Volga River, the Don Basin, and in the Far East. Reported number of Gyro vapor phase units to go in.

Cracking Unit.—Lubrite Refining Corporation (Vacuum Oil Company), erecting new cracking (reforming) unit at the newly acquired White Star Refining Company refinery (now a Lubrite unit) Wood River, Illinois. Unit of company design, contract to J. P. Devine Company.

Gasoline Plant—Standard Oil Company of California to build 50,000,000 cubic foot gasoline plant, Middle Dome, Kettleman Hills field. Estimated cost, $250,000 include short pipe line.

Gasoline Plant—Peppers Gasoline Company has completed testing new 20,000,000 cubic foot gasoline plant, processing Oklahoma City gas. (Ref. & N. G. M., April, 1932, page 76-A.)

Construction — Pan - American Petroleum & Transport Company reported still giving consideration to refinery construction program, involving cracking units at one or more of its three refineries. Indefinite maturity.

Cracking Unit—Danciger Oil & Refining Company after taking over operation of Petroleum Refractionation Company's Longview and Pampa, Texas, plants, is negotiating for cracking equipment, reported Dubbs.

Refinery—J. C. Schrouder and Bruce Young, Grandfield, Oklahoma, erecting 500-barrel skimming plant at Pilot Point, Denton County, Texas, to process crude from nearby Jacob field.

Blending Plant—Quaker State Oil Refining Company has organized a Canadian subsidiary, styled, Quaker State Refining Company, Ltd., to handle business in Canada, and will built blending plant at Toronto, Ontario, preparing full line of Quaker State products.

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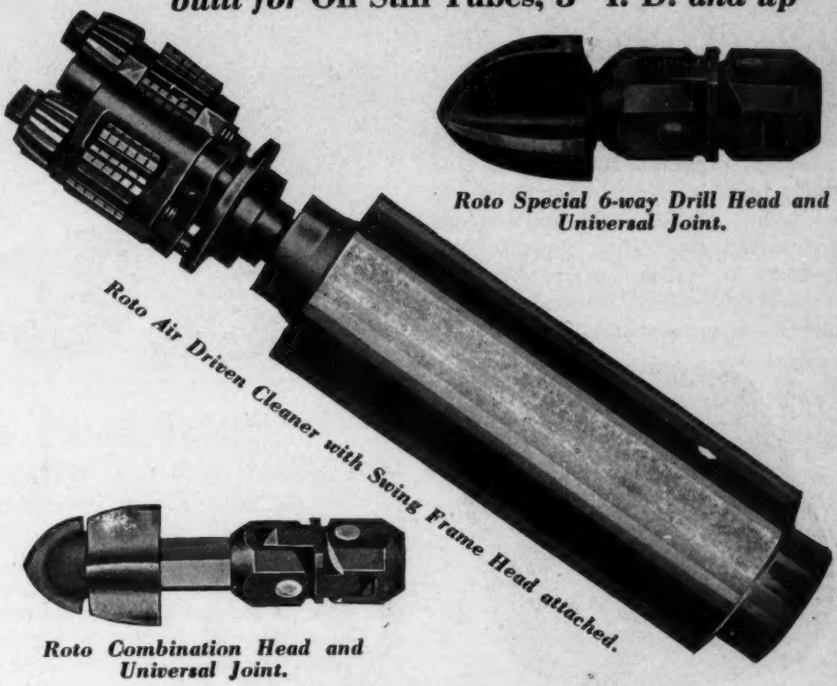

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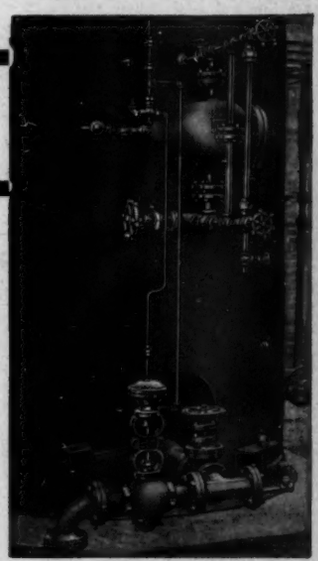

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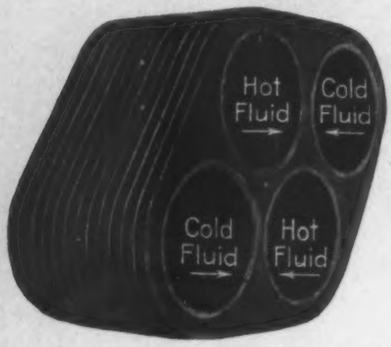
1. Heat Exchanger

GRISCOM-RUSSELL COMPANY

Griscom-Russell Company, 285 Madison Avenue, New York, New York, announces a new heat exchanger consisting of four straight tubes bonded together by closely spaced, thin, metallic plates, and designed to withstand the highest pressures encountered in refinery usage. The exchangers are available in metals of non-corrosive characteristics.



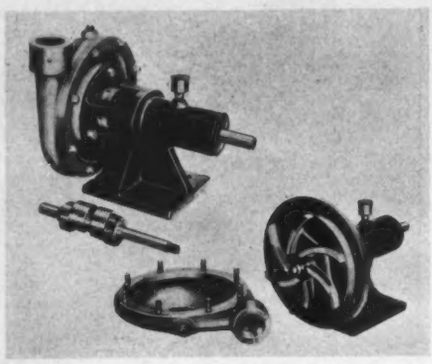
New Griscom-Russell Heat Exchanger

The design is such that a tendency to prevent accumulation of sediment is apparent by provision for high velocity and straight flow of fluids passing through the tubes. Contraction and expansion is taken care of at one end of the tubes by a return member. At the other end of the tubes is located a stationary head into which the tubes are expanded. This head contains the inlet and outlet connections.

2. Centrifugal Pump

HILLS-McCANNA COMPANY

Hills-McCanna Company, 2349 Nelson Street, Chicago, Illinois, has developed a ball-bearing, high efficiency, centrifugal pump in which the shaft and impeller alignment is accomplished by providing ball bearings to carry the load in any direction, reducing friction and permitting close tolerance in fitting the impeller in the housing.



New Hills-McCanna Pump

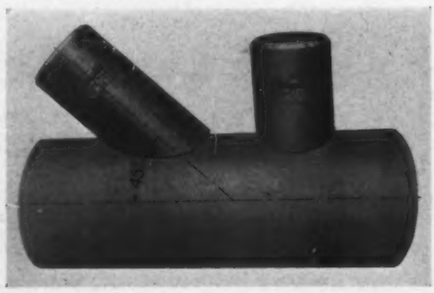
The stuffing box is of the split screw, gland type, and there is no bearing in back of the packing, thus doing away with possibility of contamination of the pumped fluid with the pump lubricant.

All parts of the pump coming in contact with the pumped liquid can be made of any machineable ferrous or non-ferrous alloy. The manufacturer stocks these pumps in acid-resisting bronze, Monel metal, pure nickel, Hills-McCanna No. 45 alloy, No. 55 alloy, No. 50A alloy, and in close-grained cast iron. The pump has removable inboard and outboard heads, easily replaceable, a desirable feature in handling highly corrosive fluids.

3. Shaped Welding Nipples

MIDWEST PIPING & SUPPLY COMPANY, INC.

Midwest Piping & Supply Company, St. Louis, Missouri, has recently placed on the market a line of shaped welding nipples which eliminate all templates when saddling one pipe upon another.



Midwest Welding Nipple

The nipple is placed in position before the opening is cut in the pipe upon which it is to be saddled; the correct opening is then easily and quickly traced from the nipple contact line. Both the shaped end and the square end are beveled for welding.

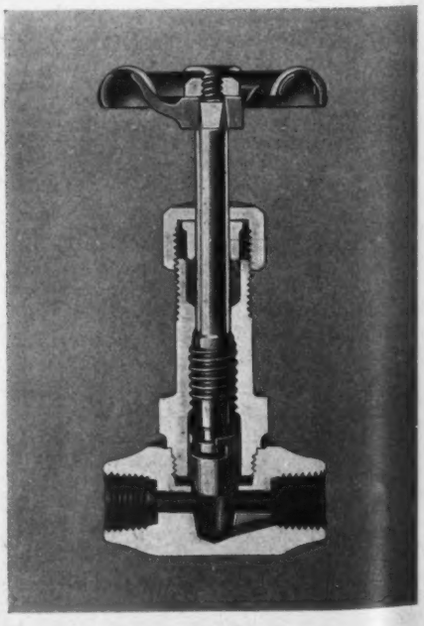
Shaped nipples (both 90° and 45°) are regularly made from standard weight and extra heavy wrought steel pipe and genuine wrought iron pipe; sizes are from 1¼-inch to 12-inch inclusive. On special order they can be provided with any type of forged lap or flange. Other angles, lengths and sizes are also available.

4. Thru-Port Valve

READING-PRATT & CADY COMPANY, INC.

Reading-Pratt & Cady Company, Incorporated, Bridgeport, Connecticut, announces the thru-port valve for refinery and other services where coking or similar troubles are encountered. It can be cleaned by running a rod through the line.

The valve is precision turned from high quality carbon steel. The stems are specially treated for high temperature service. The renewable slip-on disc for stainless steel is free on the stem to prevent sticking in the body and galling of seating surfaces. It is made non-rotatable to prevent possibility of horizontal scratching of the seating surfaces. When wide open the disc is entirely out of the fluid passageway. Body, bonnet, packing nut, and gland are Parkerized for protection against corrosion.



Reading Valve

— — — — — — — — *MAIL COUPON* — — — — — — — —

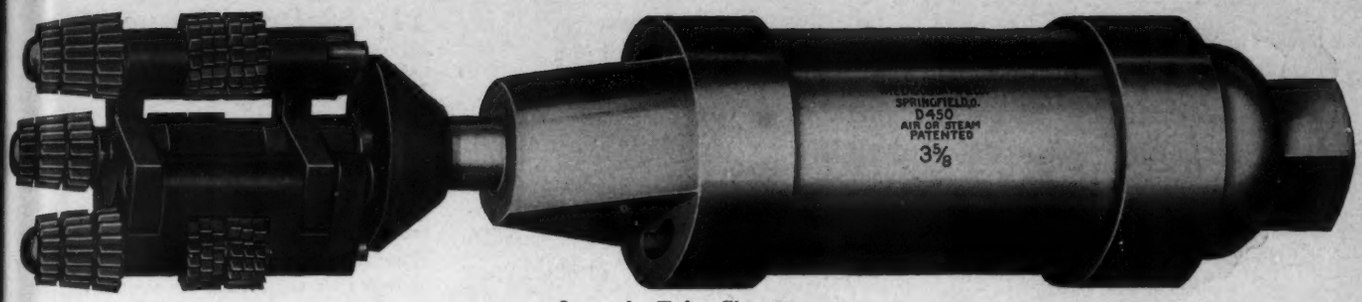
REFINER AND NATURAL GASOLINE MANUFACTURER,
Houston, Texas, U. S. A.

Please see that I am supplied, without obligation, additional information on New Equipment Items Nos.....described in July, 1932, issue of REFINER.

Name .....

Company .....

Address .....



Lagonda Tube Cleaner

5. Tube Cleaner

THE LAGONDA MANUFACTURING COMPANY

The Lagonda Manufacturing Company, Springfield, Ohio, announces the Series 450 tube cleaners, furnished with cutter heads designed particularly for still cleaning.

According to the manufacturer, the improved construction features of the Series 450 cleaners are: lengthened cylinders, bodies and rotors, new positive lubrication, and hardened bodies and improved front end. These features are supposed to develop more power with a minimum increase in air consumption. Alloy steels, especially suited to the various parts, and carefully heat treated, are employed throughout.

The cleaners are made in a range of body diameters suitable for all tubes encountered in oil stills. They are designed to clean curved tubes and return bends as well as straight tubes.

6. Milliken Valve

AMERICAN CAR AND FOUNDRY CO.

American Car and Foundry Company, 30 Church Street, New York, announce the improved a.c.f. Milliken valve, having only seven parts, and manufactured with a solid head construction which avoids the use of any glands, gland bolts, bonnets or stuffing boxes. No packing or gaskets of any kind are employed.

The valve opens and closes with a quarter turn against a positive stop. There are no seats to cut. The face-to-face dimensions of the flanged valves are the same as standard gate valves, so that these a.c.f. Milliken valves can be introduced without the necessity of changing the pipe lines.

A semi-steel, nickel, chromium composition is used for the castings for the extra heavy duty valves. This mixture gives a close-grained, dense metal of high tensile strength and is particularly suited to valve requirements.

7. Rubber Substitute

THE THIOKOL CORPORATION

The Thiokol Corporation, Yardville, New Jersey, announces an olefin-polysulfide reaction product known as Thiokol, having characteristics very similar to those of rubber but which is not affected by solvents as is rubber, according to the corporation, which specifically points out the product's resistance to the deteriorating action of most gases and liquids, particularly gasoline and oils.

8. Electric Lantern

ECONOMY ELECTRIC LANTERN CO.

Economy Electric Lantern Company, 325 West Huron, Chicago, Illinois, started production February 1, on a portable electric lantern for use in hazardous locations. It has been passed by the Underwriters' Laboratories.

"Ecolite"

The safety feature of the lantern is obtained by an arrangement which immediately opens the circuit in the event the lenz is removed or broken, thereby eliminating possibility of ignition from lamp filament. A spark-proof base, wireless switch, safety finish and other novel safety features characterize the new lamp, called the "Ecolite."

9. Shield-Arc Welder

LINCOLN ELECTRIC COMPANY

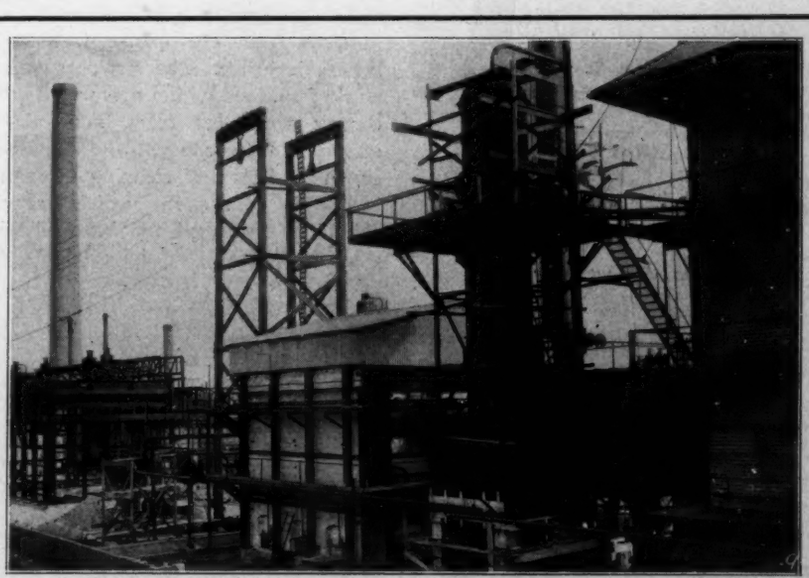
Lincoln Electric Company, Cleveland, Ohio, announces a shielded-arc welder.

A uniform welding current is one of the outstanding features claimed for the new machine. By leveling the hills and valleys or the rapid fluctuations of the usual welding current, the "Shield-Arc" is claimed to allow the use of a higher average current per given sized rod, which permits an increase in the speed of welding and the amount of weld metal deposited.

The new welder is rated at 40 volts. This rating of 40 volts is desirable for use with the shielded arc electrodes recently developed by the same company.

The new welder is also equipped with dual control which permits independent regulation of current and voltage. It also is equipped with a reversible voltage control. This innovation eliminates the shifting of cable connections to change the polarity of the welding current.

The control panel is mounted on the machine at a handy height for ordinary



H-W-W HY-PRESSURE WELDED BUBBLE TOWER
FOR HOLMES-MANLEY UNIT
THE HEDGES-WALSH-WEIDNER COMPANY
NEW YORK CHATTANOOGA, TENN. TULSA CHICAGO

THESE FEATURES . .

. . make VULCAN SUPERIOR the Tongs for Refinery Work

Seven Sizes with either Flat Link or Cable Chain for pipe and fittings 1/8" to 12"

In this latest addition to Williams' line of Superior Chain Pipe Tools, will be found the ideal Tongs for refinery work. "Vulcan Superior" is equally efficient on *pipe* or *fittings*. No parts to change, no adjustments — switch from one to the other instantly.

"Vulcan Superior's" unusual jaw design provides a greater number of "bites", assuring positive grip and reducing wear on the teeth. The reversible feature of these jaws also gives the tool double life. Each Flat Link Chain is proof-tested and *certified*.

Williams' "Vulcan Superior" Tongs embody every good feature of earlier designs *plus* many new improvements. Without question it is the best Chain Pipe Tong that has *ever* been offered pipe workers.

Your distributor can supply you.

J. H. WILLIAMS & CO.
"The Wrench People"
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Western Warehouse and Sales Office, Chicago. *Works,* Buffalo, N. Y.

WILLIAMS
SUPERIOR DROP FORGED TOOLS
VULCAN SUPERIOR
PIPE AND FITTINGS TONGS

Lincoln Welder

control. The front is in a vertical position reducing the possibility of breakage. The control panel has a dead front and no exposed live connection in either the front or back.

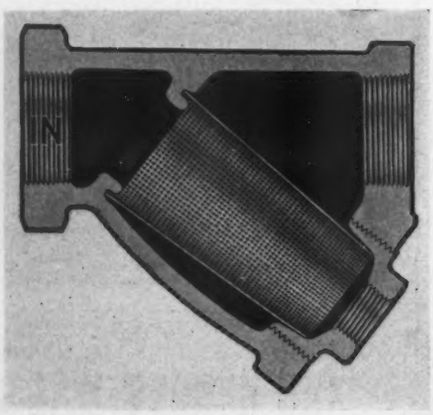
The machine is of arc welded steel construction. Also the complete generator field is of laminated construction, being composed of electrical sheet. The welders are built in AC and DC motor driven types of 300, 400 and 600-ampere sizes. Removable running gear and draw bar makes a change from portable to stationary model easy.

10. Strainer

FISHER GOVERNOR COMPANY

Fisher Governor Company, Marshalltown, Iowa, recently placed on the market a "Fre-Flow" strainer which has an extra large screen area for handling pipe line capacities of steam, air, water, oil or gas, or any other fluid with a small pressure drop.

Bodies of the strainer are furnished of nickel semi-steel or bronze construction in sizes from one quarter-inch to two inches, inclusive. The strainers are regularly furnished with a perforated bronze, electric weld, lap seam, non-collapsible screen, and according to the manufacturer, the unit is self cleaning through the blow-off connection which regularly should be furnished and installed with a small globe valve at the proper point.



Fisher Strainer

11. Electric Temperature Signal

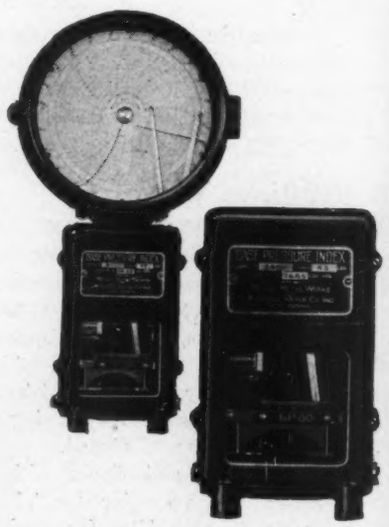
UEHLING INSTRUMENT COMPANY

Uehling Instrument Company, Patterson, New Jersey, has put on the market a new temperature signal device for determining temperature by means of electric lights. The instrument consists of different colored lights actuated by changes in temperature. When the temperature is within the limits for which the instrument is set, a white light will burn; when the temperature is above the limits, a red light will burn; and when it is below the limits, all lights will go out. The manufacturers claim the signals are accurate to within less than one tenth of a degree Fahrenheit and can be read at a distance of 200 feet.

12. Base Pressure Index

AMERICAN METER COMPANY

American Meter Company, 105 West 40 Street, New York, announces a base pressure index, an instrument which is designed to tell at a glance the exact quantity of gas at standard or base pressure that has passed through a displacement meter, regardless of variations in pipe line measure.



Left, base pressure index with volume and pressure gauge. Right, base pressure index.

The base pressure index automatically multiplies the quantity of gas passing through the meter, at pipe line conditions, by the product of the line pressure divided by the base pressure and registers the resultant on a straight reading index, according to the manufacturer.

13. Steel Flooring

MELLON INSTITUTE OF INDUSTRIAL RESEARCH

Mellon Institute of Industrial Research, Pittsburgh, Pennsylvania, announces a new type of steel flooring fabricated by

preforming two steel sheets and subsequently welding them together in the plane above the neutral axis. The flooring comes in slabs 24 inches wide and up to 12 feet five inches in length. In cross-section a unit of the flooring shows four keystone shaped cells, all connected together near the neutral axis, rendering it useful as a multiple floor-duct system for handling all types of electrical lines.

14. Split Phase Motors

WAGNER ELECTRIC CORPORATION

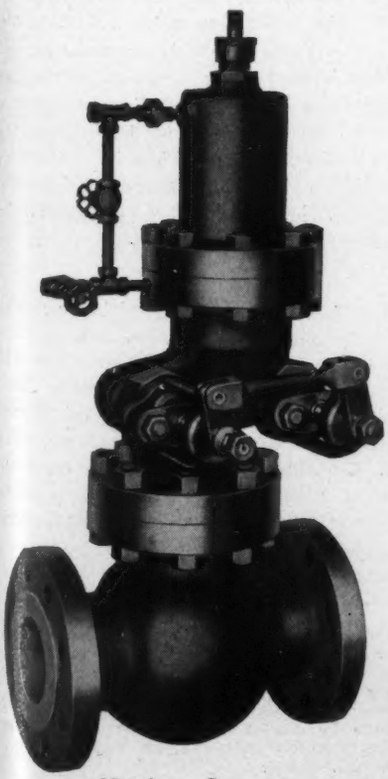
Wagner Electric Corporation, 6384 Plymouth Avenue, St. Louis, Missouri, announces Type 44RB, 1/30 and 1/20 horsepower split phase motor, redesigned for quiet, smooth and continued operation. New features of the redesigned 44RB motor are: drip proof end plates, wool yarn lubrication, handy conduit box adjustable in four positions, and redesigned switching mechanism.

15. Governor

NORTHERN EQUIPMENT CO.

Northern Equipment Company, Erie, Pennsylvania, announces the new Copes Type SDS-2 governor which controls within close limits any excess pressure from 15 to 150 pounds and can be installed on simplex or duplex pumps, and on turbine or motor-driven centrifugal pumps. It is suited for excess pressure service in boiler feeding; differential reducing valve service on motor-driven centrifugal pumps; and for constant-pressure service up to 150 pounds, according to the manufacturer.

The Copes Type SDS-2 governor is furnished in all sizes up to 6-inch, with straightway or angle style bodies, and for all pressure standards from 250-pounds upward.



Northern Governor

16. Rising Stem Gate Valve

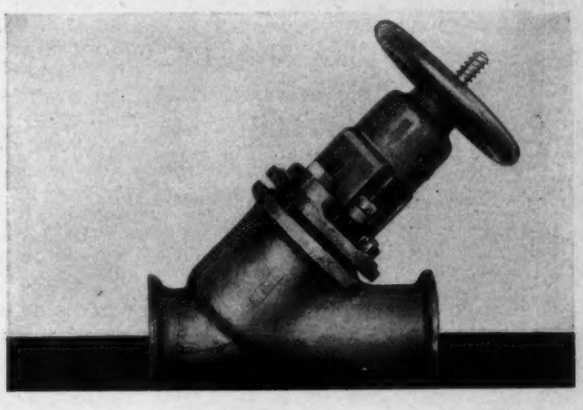
KENNEDY VALVE MANUFACTURING COMPANY

Kennedy Valve Manufacturing Company, Elmira, New York, has placed on the market a new line of rising stem bronze gate valves for 125 pounds steam pressure and 175 pounds water pressure.

The solid wedge disc mechanism of these valves is the same as used for many years in the Kennedy stationary stem bronze gate valve.

A flexible connection is provided between the disc and the stem so that the stem will not bind or spring when the valve is closed. The stem is made of a bronze composition with high tensile and torsional strength, and has a large number of contact threads in the bonnet.

The bonnet hexagon has been made extra large and close to the body so that



The VALVES

for weak sulphuric acid, caustics and acid sludge

Results given by Durimet Valves, designed and produced by Duriron engineers, have gained enthusiastic approval in the refining industry.

Durimet is a nickel-chrome-silicon alloy steel produced by the Duriron Company. It is highly resistant to sulphuric acid of different concentrations, and successfully withstands the action of caustics, acid sludges and hot or cold sulphur-bearing oils.

Of leading interest is the fact that these valves can be used with high pressures and high temperatures.

With Durimet Valves you can bid goodbye to the cost of frequent replacements. And you do not have irritating delays in production or expensive plant shut-downs.

Durimet Valves come in several types and sizes. Other Durimet equipment such as pumps, and circulating steam jets for sludge cookers, or castings to your design, are also available. Write for particulars.

THE DURIRON COMPANY, INC.
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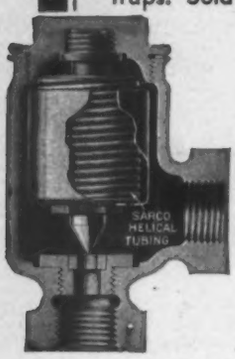
DURIMET

SARCO

STEAM TRAP

Simply screw the Sarco Steam Trap into your pipeline. It is self-adjusting for pressures from 0 to 100 lbs. That saves time. Saves work. It drains all condensation as soon as formed. Doesn't leak —doesn't waste steam. Cannot air bind.

It costs about one-third the price of big bucket or float traps. Sold on 30 days' free trial. Booklet S-95 on request.



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See Telephone book for Representatives

when a wrench is applied for installing or disconnecting, there will be no danger of distorting the bonnet. Additional features of this new Kennedy design are the deep stuffing box with gland and square section molded packing rings, the large non-heating malleable iron hand wheel which is secured to the stem by a nut, and the heavy, wide pipe end hexagons with generous number of threads.

ITEMS ABOUT MANUFACTURERS

Sarco Company, Inc., of New York, has incorporated a new company, the Spirax Manufacturing Company, Ltd., in London for the manufacture of Sarco steam traps and other specialties for the British market.

Pittsburgh Valve and Fittings Company of Baberton, Ohio, has appointed Clyde Goza of Houston representative for Oklahoma, Arkansas, Louisiana and part of Texas.

Ross Heater and Manufacturing Company announces the appointment of G. G. Van Tuyl as representative in western New York, with headquarters at Rochester. The company also announces the appointment of Arno N. Dietz as Milwaukee, Wisconsin, representative, and Gustavo Preston Company as representative in the Boston, Massachusetts, territory.

Shand and Jurs Sales Company, Denver, Colorado, announces the appointment of Harold S. Evans as central division manager. Mr. Evans will maintain temporary offices at 236 Donahue Avenue, Cincinnati, Ohio.

Neilan Company, Limited, Los Angeles, California, announces the opening of a new office at 1525 East Fifty-Third Street, Chicago, Illinois, with Arthur J. Foley in charge of sales and distribution of the company's line of automatic controlling devices for temperature, pressure and flow.

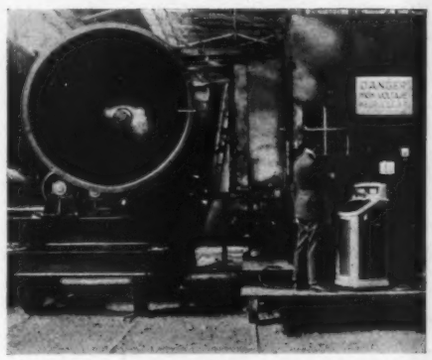
Fisher Governor Company, Marshalltown, Iowa, announces appointment of two exclusive representatives, one being the Grinnell Company, 240 Seventh Avenue, Minneapolis, Minnesota, and the other Steam Plant Equipment Company, 1012 North Third Street, Milwaukee, Wisconsin.

Struthers-Wells Company, Warren, Pennsylvania, announce the appointment of Byron L. Ashdown, Syndicate Trust Building, St. Louis, Missouri, as sales representative in the Mid-Continent and Central South states on process equipment for oil refining, chemical and allied industries.

Bergen and Wham, 617-A Public Ledger Building, Philadelphia, announce a new type of instrument service where in all type of instruments used in refineries and natural gasoline plants are repaired. This firm also announces a consultant service for those contemplating purchase of instruments.

Tube-Turns, Louisville, Kentucky, has announced the selection of D. H. Skeen & Company, 1 North LaSalle Street, Chicago, as distributor for that territory. D. H. Skeen & Company carries related items and is in position to give complete service on fittings for welding.

Marsh Valve Company, Dunkirk, New York, announces the appointment of Sarco Company, 183 Madison Avenue, New York, New York, as distributors for New York district for the Marsh line of valves.



St. John X-Ray

St. John X-Ray Corporation, 505 Fifth Avenue, New York, New York, announced recently it had installed X-ray equipment in the Sun Shipbuilding and Dry Dock Company plant at Chester, Pennsylvania, to use in the inspection of oil refinery equipment. The inspection service will not be limited to equipment of the Sun subsidiary, but will take care of equipment belonging to outside parties, also.

Foster Wheeler Corporation has appointed Consolidated Steel Corporation, Ltd. exclusive sales and manufacturing representatives for Foster Wheeler products on the Pacific Coast, including the states of California, Washington, Oregon, Nevada, Utah, Arizona and New Mexico. Consolidated Steel will handle the entire line of Foster Wheeler equipment including power plant, marine, oil refinery and gasoline plant apparatus.

Electrically Driven Centrifuges
Hand Centrifuges
WRITE
WILLIAMS, BROWN & EARLE, Inc.
Manufacturers of Laboratory Apparatus
918 Chestnut St. Philadelphia, Pa.

For Sale at Bargain Prices: New Material for Crude Pipe Still Unit, including: **Heat Exchangers; still tubes; cast iron condenser piping; tube headers; soot blowers; pipe; pumps; valves; pipe fittings; tube rollers; electrical wiring materials.** Write for detailed list. THE WINKLER-KOCH ENGINEERING COMPANY, 335 West Lewis St., Wichita, Kansas.

▼ CATALOGS . . . BULLETINS ▼

Helpful Publications Which Manufacturers Will Gladly Send Free for the Asking

Tube Cleaners

Liberty Manufacturing Company, Jeannette, Pennsylvania, has published Bulletin Z-10 devoted to the description of cleaners built particularly for cleaning still tubes. The bulletin describes two types of motors used in conjunction therewith, types of cutter heads, drills, universal joints, and mentions the use of brushes for polishing return bends and seats.

Pipe Threader

The Borden Company, Warren, Ohio, has for distribution Form 117, a folder describing the Beaver No. 17 pipe threader which may be operated by hand or power.

Refrigeration

The Frick Company, Waynesboro, Pennsylvania, has for distribution a bulletin titled "Refrigeration, the New Tool of Industry" describing some of the uses of refrigeration in various industries.

Strainers

Fisher Governor Company, Marshalltown, Iowa, has ready for distribution Bulletin No. 23 devoted to "Fre-Flow" Type 260 strainers which have extra large screen areas for handling pipe capacities of steam, air, water, oil, or gas, or any other fluid with a very small pressure drop.

Tube Cleaners

The Lagonda Manufacturing Company, Springfield, Ohio, has published a new 24-page Catalog X-12 describing its general line of tube cleaners.

The company also announces a Bulletin X-13 covering new "Series 450" cleaners for oil stills. The 450 series incorporates refinements and improvements in motor and heads which result in greater power and speed.

Conical Scrubber

Hardinge Company, Incorporated, 122 East 42 Street, New York, N. Y., has published a bulletin describing a conical scrubber for cleaning aggregate, such scrubber being an improved design.

Compressors and Vacuum Pumps

Fuller Company, Catasauqua, Pennsylvania, has published for distribution Bulletin C-3, a 16-page illustrated booklet describing single and two-stage compressors and vacuum pumps, together with auxiliary equipment for same.

Monel Metal Bolts

The International Nickel Company, 67 Wall Street, New York, has released for distribution Bulletin T-1 describing properties, uses and types of Monel Metal bolts.

"Nickel Steel Topics"

The International Nickel Company, Inc., 67 Wall Street, announces the first issue of a bimonthly, illustrated, miniature newspaper called "Nickel Steel Topics," which will be devoted exclusively to nickel alloy steels and contain technical and semi-technical and news articles dealing with the production, treatment and uses of these steels.

Fuel Oil Burning Systems

Schutte & Koerting Company, Philadelphia, Pennsylvania, have issued Bulletin 16-A describing mechanical fuel oil burning systems. The bulletin contains 20 pages and is illustrated.

Laboratory Supplies

F. V. Hiergesell Manufacturing Company, 55 Vandam Street, New York, has for distribution a four-page illustrated bulletin devoted to hydrometers, thermometers, laboratory glassware and supplies.

Chromium Still Tubes

Spang, Chalfant and Company, Incorporated, Clark Building, Pittsburgh, Pennsylvania, has for distribution Bulletin A-2, devoted to seamless, four to six per cent chromium still tubes, designed for cracking high sulphur, corrosive crudes at elevated temperatures and increased pressures.

Stainless Steel Motor

The Lincoln Electric Company, Cleveland, Ohio, has for distribution a folder describing an induction type motor that is enclosed and fan cooled and illustrating construction features thereof.

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(Address manufacturer direct)

. . . . . .

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Please send to me, without obligation, free booklet described in the July, 1932, issue of REFINER AND NATURAL GASOLINE MANUFACTURER.

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***"Hy-Speed"* Portable Electric Mixers blend, compound, mix or agitate all oils and liquid chemicals . . . better and more economically.**

They clamp to any tank or vat . . . require no installation. Capacities from 5 to 50,000 gallons.

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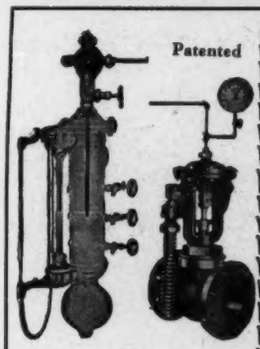
ALSOP ENGINEERING CORP.
39 West 60th Street, New York City



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For steady, reliable, year-after-year boiler feed regulation — with floats, thermostats, generators, and links eliminated—refiners are now using the

CAMPBELL Boiler Feed Regulator

The Campbell unfailingly makes good. It maintains the water level WHERE WANTED, all the time. No moving parts to go wrong. No fine adjustments. Costs less to install.

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Burrell Industrial Gas Masks

(The G-M Series)

The G-M Series of Burrell Gas Masks includes a wide selection of Canisters for Protection against practically all poisonous industrial gases and vapors with the exception of Carbon Monoxide Gas.

THE BURRELL ALL SERVICE GAS MASK IS THE ONLY OFFICIALLY APPROVED CANISTER TYPE MASK FOR PROTECTION AGAINST CARBON MONOXIDE

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Photostat copies of original articles will be supplied at cost by the Leslie Laboratories. Complete or limited bibliographies covering special topics by title, by abstract, or in complete manuscript, will also be prepared and furnished at reasonable cost by the Laboratories.

Fundamental Physical Data

Total Heats and Specific Heats of Synthetic Paraffinic Distillates and Some Petroleum Fractions. A. J. E. SWANN. *Fuel* **11** (1932) pp. 113-8.

Three distillates b.p. 100-130°, 130-160°, 160-190°C., and containing less than 1.5% unsaturateds and naphthenes were prepared by cracking paraffin wax with $AeCl_3$ and refining and fractionating the products. Two straight-run fractions were separated from Persian distillate, b.p. 100-125° and 125-150°C. The total heats from 0° were found to be parabolic functions of the temperature. For example, for the 100-130°C synthetic distillate H was given by $H = 0.524t + 0.0004t^2$. The sp. ht. of the paraffin distillates was found to be a linear function of sp. gr. The equation is Sp. Ht. $= 1.65 - 0.913d + 0.0008t$. The temp. coeff. of sp. ht. was found to be independent of sp. gr. Mean mol. wt was a linear function of sp. gr.

Some Heat-Capacity Data on Organic Compounds Obtained with a Radiation Colorimeter. M. E. SPAGHT, S. B. THOMAS, and G. S. PARKS. *J. Phys. Chem.* **36** (1932) pp. 882-8.

The heat capacities of naphthalene, hexamethylbenzene, diphenyl, pentacosane, tritriacontane, triphenylmethane, and several other compounds were measured in the liquid and solid states. Heats of transition and fusion were determined.

Methods and Equipment Used at the Bureau of Physico-Chemical Standards. VI. Heats of Combustion. M. BECKERS. *Bull. Soc. Shim. Balg.* 40 (1931) pp. 518-610.

The correct procedure for determining heats of combustion with great precision is discussed at length. The following results, as colories per gram, were obtained: Naphthalene 9604.9, anthracene 9457.6, dotriacontane 11146.0, cetylic alcohol 10,302.7, anthraquinone 7427.2, salicylic acid 5237.2, succinic acid 3026.3, salol 6819.3, and benzophenone 8529.3.

Chemical Composition and Reactions

Synthesis and Crystal Spacings of Certain Long-Chain Paraffins, Ketones, and Secondary Alcohols. S. H. PIPER, ET AL. *Biochem. J.* **25** (1931) pp. 2072-94.

Carefully purified paraffins from $C_{26}H_{54}$ to $C_{36}H_{74}$ were prepared and their crystal spacings determined. Two transition temps. at which a visible change in structure occurred were noted. The data should be useful in the separation and identification of natural paraffins.

Chemistry of Petroleum. H. I. WATERMAN. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 429-38.

Among the subjects covered are the chlorination of hydrocarbons, halogen acid addition compounds of unsaturated hydrocarbons, production of caproic acid, polymerization of acetylene and production of chloroprene and its polymers, chemistry of cracking, catalytic polymerization of olefines, high-pressure hydrogenation, estimation of different classes of hydrocarbons, dehydrogenation and inter-relationships of properties. 33 references are included.

The Oxidation of Pentane and Other Hydrocarbons. L. M. PIDGEON and A. C. EGERTON. *J. Chem. Soc.* **135** (1932) pp. 661-86.

Heated in glass at constant volume, 1:1 mixtures of pentane and oxygen show an induction period followed by an increase in rate of pressure rise at 245-6°C. This "reaction temp." is raised by rapid heating, glass packing, change of proportion from 1:1, or lowering of pressure, and lowered by use of silica vessel or by dilution with nitrogen. Reaction temperatures for other hydrocarbons are hexane 224°, iso-pentane 245°, amylene 200°, amylaldehyde 84°, and iso-amylalcohol 280°. Lead tetra-ethyl (0.1%) in the pentane-oxygen mixture shortens the induction period and lowers the reaction temperature. However, if the $PbEt_4$ and O_2 are admitted first the oxidation of subsequently introduced pentane is greatly inhibited.

Oxidation of Petroleum Oils in Presence of Analytically Inappreciable Catalysts. K. I. IVANOV and N. N. PETIN. *J. Gen. Chem. Russ.* **1** (1931) pp. 704-16.

Washing the oil with tap water greatly increased the oxidisability of the two samples of Caucasian petroleum, one predominantly paraffinic and the other naphthenic. Both contained naphthenic acids. If the water is boiled with H_2SO_4 and neutralized with Ca $(OH)_2$ the activity is destroyed. Distilled water was found inactive. Addition of iron salts or colloidal iron did not activate distilled water.

Thermal Decomposition of Tetra-ethyl Lead. J. H. SIMONS, R. W. McNAMEE, and C. D. HURD. *J. Phys. Chem.* **36** (1932) p. 639.

$PbEt_4$ was heated in sealed bulbs at normal pressure for considerable periods of time and also at reduced pressure in flow for short times. Two sets of reactions were found. One occurs on the walls of the vessel. The other is a homogenous gas-phase reaction. At low temperature the products were carbon, tar, and some isobutylene. The mechanism of the reactions is discussed.

Manufacture: Processes And Plant

Holding Power and Tightness of Heat Exchanger Tubes. C. O. SANDSTROM. *Chem. & Met. Eng.* **39** (1932) pp. 323-5.

Three-quarter inch 18-gauge admiralty tubes were rolled into smooth and threaded holes and the yield load determined. Tests were also made in compression in an effort to force the tubes through the holes. This could not be done. Fluid pressure tests were made on rolled and welded tube joints of several types. The conclusion was reached that a joint made by rolling a tube into a reamed hole is satisfactory. Auxiliary welding is not necessarily an improvement. If used, the weld should be depended on for tightness.

Heat Exchangers in Modern Industrial Practice. B. HEASTIE. *Ind. Chem.* **8** (1932) pp. 87-9.

The formulas for determination of heat transfer in various types of exchangers are reviewed.

Fluctuating Flow of Heat in Furnaces. R. J. SARJANT. *Trans. Ceram. Soc.* **31** (1932) pp. 83-128.

The flow of heat through furnace walls was studied with variation of the dimensions of walls, lagging, rate of heating, and temperature. The data are in fairly good agreement with deductions from expressions derived through the Fourier equation.

The Thermal Conductivity of Low-Temperature Insulators. N. H. CHAMBERLAIN. *J. Soc. Chem. Ind.* **51** (1932) 89-91 T.

The coefficient of thermal conduction K is expressed as cal./sq.cm./sec. Values of K for various materials are: metals 0.01 to 1.0, firebrick 0.003, glass 0.0017, ebonite 0.00032, air 0.00005, and the ordinary insulating materials 0.0009 to 0.0005. Wool fabrics are 23.6% more efficient than cotton fabrics and have distinct advantage over cork and asbestos in

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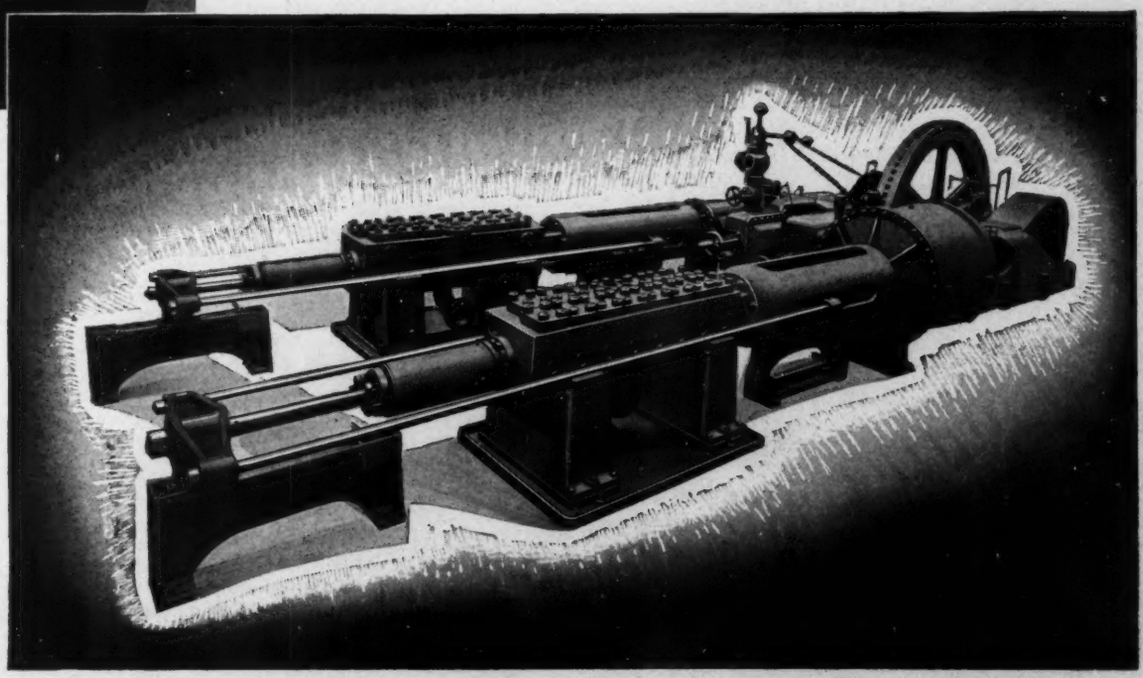

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not developing cavities and in having a lower thermal conductivity.

Types, Uses, and Testing of Refractory Cements. W. R. KERR. *Chem. & Met. Eng.* **39** (1932) pp. 331-2.

The composition of various types of refractory cements is given including air-settling and high temperature bonding cements. The methods of applying these cements is briefly discussed as well as methods of testing different products.

Status of Hydrogenation of Petroleum, Bitumen, Coal Tar, and Coal. T. E. Warren. *Chem. News* **144** (1932) pp. 193-9.

The processes of Bergius, I. G. Farbenindustrie, and Standard Oil Co., and the work of the British Fuel Research Board are briefly reviewed. The cost of hydrogenating oil is estimated as 5.47 cents per Imperial gallon. Hydrogenation of Canadian coals or bitumens is problematical. Oil hydrogenation in Canada is more promising.

Gum Formation and Its Inhibition in Motor Spirits. W. H. THOMAS. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 350-6.

The Institution's first annual review of the subject of gum formation and inhibitors. The theories of gum formation and of the action of inhibitors are briefly recited. The work on specific inhibitors is reviewed. A list of British patents dealing with inhibitors and a bibliography of 45 references are included.

The Refining of Mineral Oils by Cold Fractionation. H. STEINBRECHER. *Braunkohlenarch. No.* 31, (1930) pp. 1-10.

Paraffins and naphthenes were separated from aromatics, phenols, and nitrogen and sulfur compounds by use of solvents such as ethylene chlorhydrin, benzyl alcohol, and furfural.

Effect of Oxygen on Gaseous Hydrogen Sulfide Corrosion of Tank Steel. J. M. DEVINE, C. J. WILHELM, and L. SCHMIDT. *U. S. Bur. Mines, Reports of Invest.* No. 3160, Feb. 1932.

Previous studies of corrosion by hydrogen sulfide are discussed. A laboratory study of corrosion of steel by H_2S at low temperature is described. Particular attention was paid to the effect of the presence of oxygen in various concentrations. The conclusions were reached that: (1) Oxygen must be present to cause corrosion; (2) the oxygen in H_2S ratio is the most important factor affecting the extent of the corrosion and maximum corrosion occurs when this is approx. 114; (3) gases of small H_2S content corrode more actively than those of large H_2S content in the presence of a low concentration of oxygen; (4) corrosion is proportional to time and the scale is therefore nonprotective; (5) to reduce corrosion in the field eliminates oxygen so far as possible.

Boiler Slime, a Hitherto Unrecognized Source of Danger. H. RICHTER. *Chem. Ztg.* **56** (1932) pp. 173-4, 195.

When boiler feed-water is softened by zeolite treatment or by soda or sodium phosphate a small residual hardness remains that results in the production of boiler slime. The $NaHCO_3$ and Na_2CO_3 in the feed-water are hydrolyzed at the high temperature and pressure and the bubbles of CO become attached to the particles of slime and settle at the ends of the boiler, around seams and rivets, and along the tubes. The local high concentration of CO_2 exerts a corrosive action on the iron converting it to ferrous carbonate with liberation of hydrogen. The ferrous carbonate hydrolyzes and oxidizes to ferric hydroxide, thus increasing the slime and accentuating the action. The NaOH formed by hydrolysis causes caustic embrittlement and forms further points of attack for the collection of slime and CO_2. Slime coated surfaces act anodically to clean surfaces and the latter corrode electrolytically. These several actions are the cause of the local pitting observed in boilers. The remedy is the more frequent removal of slime by blowing-down.

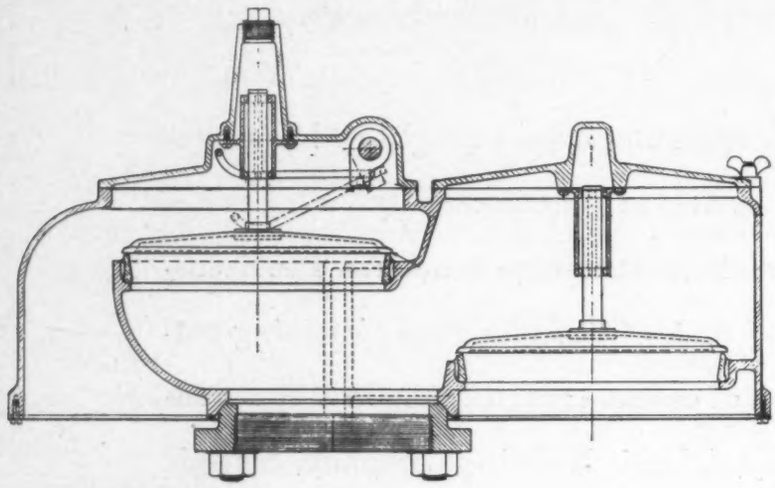
Products: Properties and Utilization

Gasoline and the Gasoline Engine. O. THORNYCROFT and A. FERGUSON. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 329-49.

Statistics of gasoline production and consumption are reviewed. The anti-knock value of gasoline is discussed and interesting data on individual hydrocarbons given. The position of ethyl gasoline, natural gasoline, benzol, alcohol, and aircraft fuels is briefly considered. The phenomenon of "ring-gumming" in aircraft engines is noted. The trend in engine design as regards number of cylinders, valves and valve gear, camshaft, pistons, bearings, and lubrication is briefly reviewed for passenger and commercial vehicles, and for aircraft.

Fuels for Aircraft Engines. F. R. BANKS. *J. Roy. Aer. Soc.* **36** (1932) pp. 127-40.

The fuel should be regarded as an engineering material in the same sense as the materials of construction. A minimum grade of fuel should be specified and the engine should not be run with a poorer product. The subject of detonation is reviewed. The effectiveness of tetraethyl



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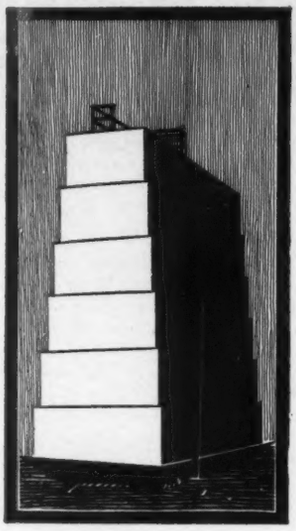

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lead with respect to benzol is greater at higher temperatures. Benzol raises the mean operating temperature when used in increased proportions in the fuel. The use of cooled valves is recommended to eliminate hot spots. High temperature resulting from detonation increases lubricating oil consumption. Test-engines and procedures are described.

Determination of the Rate of Rise of Pressure in the Combustion of Some Gas-Oxygen Mixtures. C. CAMPBELL, W. B. LITTLER, and C. WHITWORTH. *J. Chem. Soc.* **135** (1932) pp. 339-48.

Rates of pressure-rise in a bomb after ignition with a spark are given for mixtures of oxygen with hydrogen, methane, ethylene, and carbon monoxide. The rise of pressure is smooth if either fuel or oxygen is present in large excess. On approaching the theoretical mixture it is too rapid to measure except for $CO:O_2$. The compositions of mixtures reaching the maximum pressure in 0.04 seconds are those of the detonation limits.

Alcohol Motor Fuel in Europe. G. KALTENBRUNNER. *Facts About Sugar* **26** (1931) pp. 67-8, 71.

Alcohol in Europe is made from agricultural products, molasses, and sulfite pulp waste liquor. Alcohol from the first source is too expensive. The cost of molasses has been variable. In Sweden alcohol from sulfite liquor is sold for 23-25 cents per gallon. In most countries alcohol does not compete directly with gasoline but has government support through monopoly or legally required admixture with gasoline to make motor fuel. The motor fuel situations in France, Germany, Hungary, Poland, Italy, Austria, and Czechoslovakia.

Kerosene and White Spirit. W. A. WOODROW. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 357-61.

Current studies of the refining and composition of kerosene are reviewed. Several articles dealing with the relationship of chemical composition and smoking are included. Two articles discussing the relative value of turpentine and white spirit (naphtha) are reviewed. The bibliography includes 23 references.

Lubricants. E. A. EVANS. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 362-75.

The work on synthetic lubricating oils and hydrogenated lubricants is reviewed. Numerous papers on viscometry and viscosity-temperature relations are mentioned or briefly discussed. Measurement of the acidity of oils has been found to be a more difficult problem than previously thought. Several papers deal with viscosities at low temperature, thermal conductivity of lubricants, latent heats, molecular weights, frictional coefficients, theory of lubrication, engine design in relation to lubrication, deterioration of oils with use, oxidation of oils, pour point, melting point, vacuum distillation, cold starting, dilution, transmission lubricants, and oil reclaiming are included; 102 references are given.

Lowest Values of Flash Points of Compressor Oils. M. MIZUTA. *J. Soc. Chem. Ind., Japan,* **35** (1932) pp. 41-2B.

Calculations, based on initial and final pressures and number of stages, of compression ratios and temperatures in various air compressors lead to the conclusion that the final temperature was rarely above 130°C. Therefore, the minimum safe flash point for compressor oils can be taken as 180°C.

The Question of Top Lubrication in Automobiles. E. KADMER. *Petroleum Zeit.* **28** (1932) No. 7, Motorenbetrieb u. M. S. **5** No. 2, pp. 2-3.

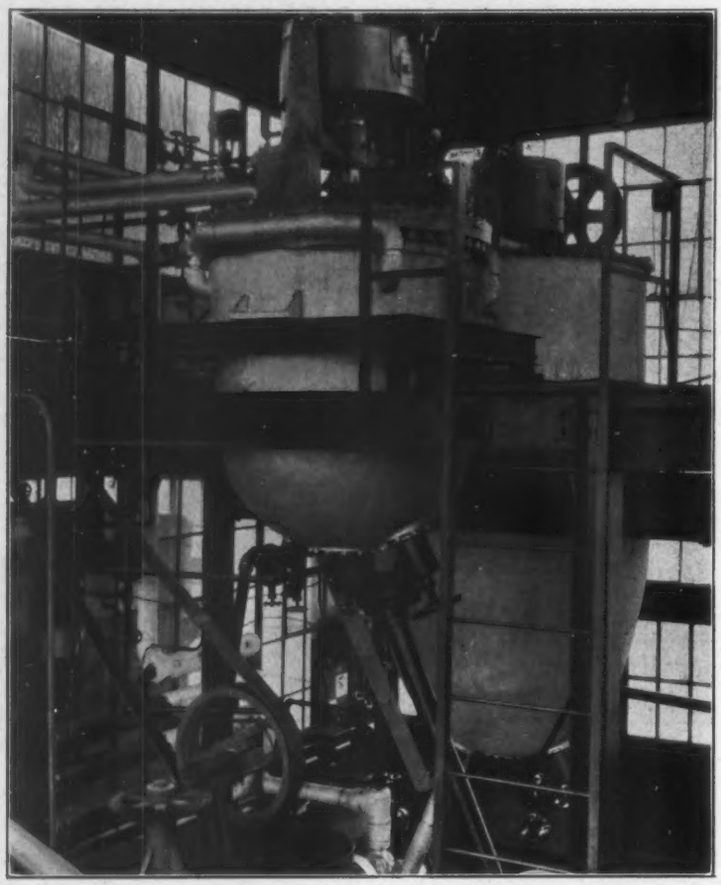
Top properties of the ideal top lubricants are given and various commercial products considered in the light of the desired qualities.

Gas Oils, Diesel Fuels, and Fuel Oils. F. H. GARNER. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 376-82.

The properties desired in absorbent oils and gas oils and methods of evaluation are reviewed. Current work on the properties and combustion of Diesel engine fuels is cited and briefly discussed. The industrial and domestic application of fuel oils and specifications for these products is reviewed.

The Value of Fractional Distillation Analysis in Determining the Quality of Diesel Fuel Oil. E. PYHALA. *Teknillinen Aikakauslehti* **21** (1931) pp. 141-5.

The burning quality of Diesel fuel oil cannot be determined from sp. gr. flash point, viscosity, pour point, ash content, or cake or asphalt residue. The acid value shows only naphthene acid content. Distillation curves differ little for various samples. The aniline number shows the proportions of paraffins and naphthenes and the dimethyl sulfate number of unsaturated and aromatic hydrocarbons, but these data are of little help in evaluating the fuel. The author proposes that 50 cc. of oil be treated with 100 cc. normal benzine and that 10 cc. conc. H_2SO_4 be added to the solution. Shake for 3 minutes, allow to stand 1 hour, and separate the layers. The asphaltic components are thus determined. The upper layer is fractionated in cuts to 250°C., 250-300, and 300-350. The lowest boiling fraction should be 50% or more of the



Typical installation of Dopp Pressure Mixer and Dopp Open Kettle in relatively small grease plant. Easy cleaning, because of the design and construction of Dopp Equipment, is one reason why these kettles are so popular in plants such as this one where a wide range of products must be made in a few units. Saponification under pressure and the quick heat transfer due to positively scraping agitators combine to give economical operation. The suitability of the equipment was determined in advance of purchase by tests which this company carried out in the Dopp Experimental Department.

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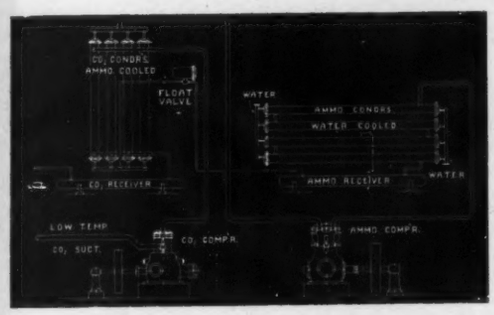

Diagram Showing Arrangement of Equipment in a Frick Plant to Produce Low Temperatures on the Split-Stage Principle

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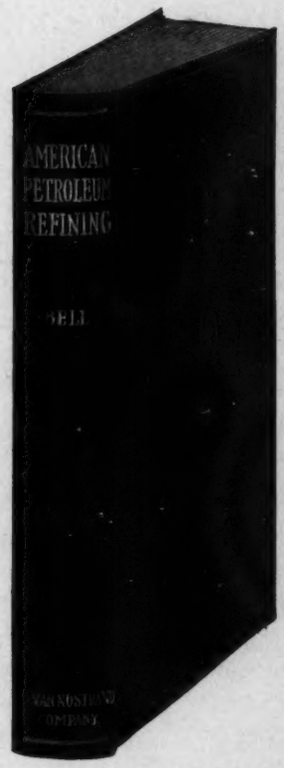
American Petroleum Refining

By **H. S. BELL, C. E.**



Every detail of American refinery practice—the most up-to-date developments as well as the standard methods—are fully covered in this book. Vapor phase cracking, the production of high compression gasoline, the development of modern pipe stills, the use of Diesel engines in oil pumping, and hundreds of other subjects of equal interest and importance, are discussed, covering in full every detail of oil refinery operation, engineering, and design.

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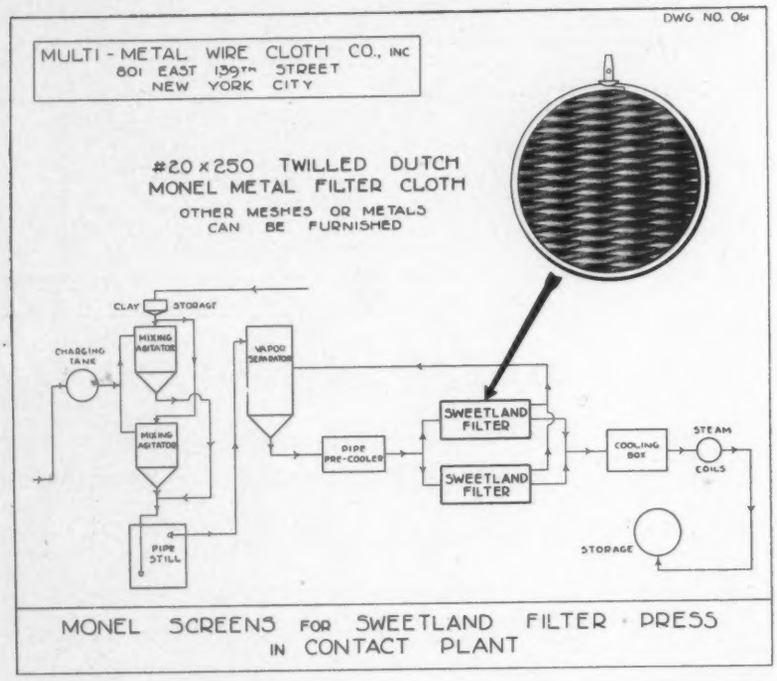

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whole, and the two lowest fractions 80% if the oil is suitable for use as Diesel fuel oil.

Asphalt and Road Materials. F. LEVY. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 391-403.

The subjects discussed are nomenclature, chemical composition. Rock asphalt, natural asphalt, petroleum bitumens, blowing, treatment, road building, tar, emulsions, roofing and paints, and specifications and testing.

Paraffin in Petroleum Asphalt. J. B. LONGINUS. *Erdol und Teer* **8** (1932) pp. 125-7.

German asphalt specifications allow up to 2.0% paraffin as determined by Marcusson's method. This is equivalent to 3.4% by the distillation method. The ductility of paraffin-containing asphalts decreases greatly on heating. An asphalt with 1.0% paraffin lost 80% of its ductility upon heating to 180°C. Another with only traces of paraffin lost only 20%. Both were made by the same manufacturer and had an initial ductility of 100 cms. Viscosity (by consistometer) also falls markedly with increase in paraffin content. These effects are related to paraffin crystal size. Heating in air before use causes the crystal size to decrease from 0.1 mm. to 0.01-0.02 mm., so that the surface area of the paraffin increases 100-fold. At present the user is held responsible for trouble that develops. Specifications should be changed to lower allowable paraffin content and to permit not more than 20% loss in mechanical properties on heating.

Special Products. E. B. EVANS. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 404-14.

Among the subjects covered are the isolation and identification of naphthene acids, phenols, and nitrogen compounds from petroleums, the freezing and flow-points of anti-freeze compounds, the manufacture and properties of carbon black, the production of helium, oils for insecticidal preparations, composition, structure, crystallization and purification of paraffin waxes, solvents for wax and oil separations, synthetic products from olefines, liquid gases, solid carbon dioxide, cutting oils, emulsifying agents, petrolatum, acid recovery, and printing inks; 82 references are included.

Analysis and Testing. A. W. COX. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 420-28.

Work on chemical analyses and physical tests related to gasoline, anti-knock properties, gum, vapor pressure, vapor-lock, sulfur content, corrosion, lead tetra-ethyl, water, aromatic and other hydrocarbons, molecular weights, viscosity, acidity, sludge formation, sulfur content, heats of combustion, melting point, consistency and other related topics is reviewed; 89 references are included.

Determination of the Specific Gravity of Fats, Oils, and Waxes. M. A. RAKUSIN. *Petroleum Zeit.* **28** (1932) No. 8. *Asphalt u. Stassenbau* (2) pp. 3-4.

The pyknometer described is a modification of Gintl's apparatus. It comprises a straight tube that is easily cleaned. The lower end sets in a glass housing and the upper is fitted with a glass cover plate. The assembly fits in a metal stand with a vertical screw that clamps the members together to prevent leakage. A second method involves the use of a wide-necked stoppered cylinder that is weighed full of a light liquid such as alcohol. Pieces of the sample are introduced and the cylinder reweighed and the sp. gr. of the sample calculated.

Unification of the Term Viscosity. C. H. WEISS and P. WOOG. *New. Intern. Assoc. Testing Materials,* Sept. 1931, 23 pp.

Viscosities as determined by various instru-

ments are not comparable. It is suggested that coefficients of viscosity should be given as poises and kinematic viscosities as "stokes." The relationships between kinematic viscosity and viscosities as determined by different commercial instruments is given in tabular form.

Determination of Acidity of Oils Using Alkali-Blue 6B as Indicator, A. R. MATTHIS. *Chim. et Ind.* **27** (1932) pp. 503-12.

Two procedures are described for determining the acidity of transformer and turbine oils. Carbon dioxide free air is used for stirring in one. Alkali-blue 6B is particularly suitable for titrations in ethyl alcohol-benzene (2:1) solution. A saturated solution of the dye in ethyl alcohol is made and filtered. The titration is made with 0.1 N alcoholic caustic potash in the cold. The end-point is clear.

Rapid Method for Determiination of Iodine Numbers of Commercial Lubricating Oils. E. GALLE and M. BOHN. *Erdol und Teer* **8** (1932) pp. 76-7, 91-2.

The rapid iodine-number method of Margosches was studied to make it applicable to lubricating oils. 0.1g of oil is dissolved in a solvent, 25 mol.N/5 alcoholic iodine solution and 200 ml. water are added, and after a 5 minute reaction period the excess iodine is titrated with n/10 tiosulfate. The selection of the solvent is most important. Ether-acetone 1:2 is satisfactory when 10 ml. is used. The use of emulsifying agents was studied. Use of 0.1% of naphthenic acid soap gave values in good agreement with the Hubl method.

Natural Gas, Natural Gasoline and Gas Recovery

Recent Advances in Gasoline Extraction by the Active-Carbon Process. E. REISEMANN. *Petroleum Z.*, **28** (1932) No. 6, pp. 1-13.

The modern Bayer plants for gasoline recovery from gas are so designed that the gasoline in the activated carbon is displaced by saturated steam flowing in the opposite direction to that in which the wet gas was passed through the carbon. The character of the product is controlled by manipulation of the condensing system. The carbon is dried by direct contact with preheated gas and the moisture is removed from this gas in a chamber cooled by gas. Operation of the plant is continuous.

Ethyl Alcohol from Refinery Gases. V. GERR, O. PIPIK, and E. MEZHEBORSKAYA. *Azerbaidzhanskoe Neftyanoe Khozyaistro,* 1932, No. 2, pp. 15-21.

Ethylene is separated from other components of the gas by selective charcoal adsorption. Steam is used to remove it from the charcoal. The ethylene is dissolved in 1.84 sp. gr. H_2SO_4 containing 0.1% silver (13-15% yield) or iron (8% yield) as catalyst. The ethyl alcohol obtained is exceptionally pure. Details of experimental data are given.

Preparation of Pure Ethane, Methane, and Hydrogen, and the Analysis of Their Mixtures. W. E. MACGILLIVRAY. *Jour. Chem. Soc.* **135** (1932) pp. 941-52.

Methods of preparing and purifying methane and ethane are given. The fractionation column is described as well as its use in analyzing gas mixtures. Mixtures containing two hydrocarbons can be satisfactorily analyzed by the explosion method if proper precautions are taken. If hydrogen is present it can be removed by oxidation with palladium-black catalyst.

Here's how to clean those heat exchanger tubes . . . and *any other small tubes from 3/4 in. to 2 in. O. D.*

No longer is it necessary to remove the tube bundle of the heat exchanger, and place it on the ground for cleaning. The Liberty "OS" Cleaner cleans the tubes in place. On a recent job one of these machines cleaned 208 one-inch steel tubes 20 ft. long—approaching a mile in total distance—in four and one-half hours. The tubes were cleaned right down to the metal.

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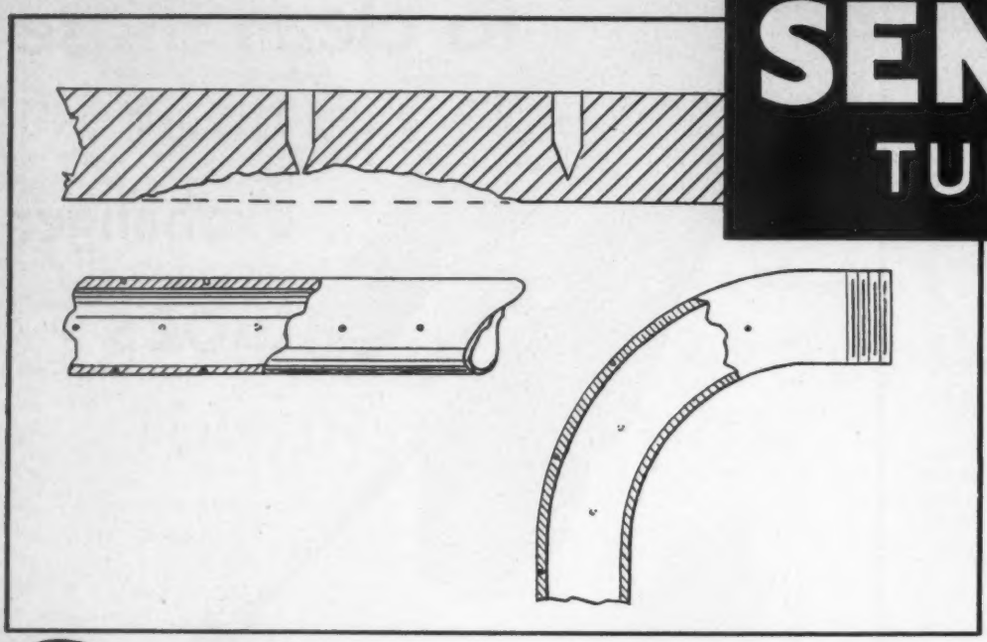

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NATIONAL Sentry Tubing answers a very definite demand of refinery engineers. This demand is for pipe and tubes which when installed in and around a pressure still will not be subject to unexpected and dangerous failures due to internal corrosion or wear. When the walls of NATIONAL Sentry Tubing are thinned by either erosion or corrosion from within, a tiny leak will appear through a small hole drilled part way through the pipe or tube wall especially for this purpose. This hole is cone-shaped at the bottom, and as the wall is gradually eaten away, the hole grows larger and the leak becomes plainly noticeable, indicating that the metal has been worn at this point. Experiments carried on by refinery engineers in the field, demonstrated the soundness of the method involved, but drilling into equipment in actual use, at a sufficient number of points, at proper intervals, and with proper control of depth, was too burdensome and costly. NATIONAL Sentry Tubing is pre-drilled under a technique that is definite and embodies all that has been found most satisfactory in pipe and tubes for such use. Actual bursting tests show that this drilling does not impair the strength of the pipe and tubes.

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THE MONTH IN REVIEW

Petroleum Refineries In the United States

"PETROLEUM Refineries in the United States," the annual survey of refineries in this country, is ready for distribution and can be secured from Section of Publications, United States Bureau of Mines, Washington, D. C., (at no cost) by requesting Information Circular 6641. The discussion and compilation was prepared by G. R. Hopkins, economic analyst, assisted by E. W. Cochrane. The report indicates a total of 473 completed refineries, six plants building, and 365 operating plants with 108 plants shut down. Total daily capacity amounted to 4,020,428 barrels for the industry, of which total 3,622,092 barrels capacity is reported operating, and 8720 barrels building. In 1931 the average total capacity of the operating plants amounted to 3,744,000 barrels, and the daily average throughput was 2,450,000 barrels. This indicates that the refineries operated at an average of 65 per cent of their capacity, compared with 69 per cent in 1930 and 78 per cent in 1929.

The list of refineries, whether operating, shut down, or building, is arranged alphabetically, by states, with total capacity for each state given. Plants are reported by company name, railroad connection, location, daily capacity and type of plant. The break-down by type is as follows: Skimming, 299 plants; skimming and lube, 27 plants; complete, 90; skimming and asphalt, 15; skimming, lube and asphalt, 4; lube, 8; asphalt, 11; topping, 24; miscellaneous, 1; total 479 operating, building and shut down.

Lime-Salt for Removing Hydrogen Sulphide

A SOLUTION of lime, salt and water is effective in the removal of hydrogen sulphide from antural gas. A discussion of this practice is presented in Report of Investigations, 3178, "The Use of Lime in a Salt Solution for Removing Sulphide from Natural Gas," by H. P. Rue. This report is available from the Section of Publications, U. S. Bureau of Mines, at no charge. The report consists of a complete discussion of the process, details of construction and flow chart and cost figures as relating to the removal of hydrogen sulphide from natural gas. The process should prove applicable to the refinery in the removal of hydrogen sulphide from refinery gases, as it is similar to systems now in use. The process is being used to remove the hydrogen sulphide from natural gas before extraction of the natural gasoline content, and results in lowered chemical treating costs for the finished natural gasoline.

The thirteenth annual meeting of the National Petroleum Association will be held September 14, 15 and 16 in Atlantic City. As in recent years the Traymore hotel will be headquarters. The program will be announced later.

A. P. I. Fundamental Research Report

THE American Petroleum Institute has ready for distribution the annual report on fundamental research in petroleum. The report embraces discussion of projects pertaining to the composition and properties of petroleum, projects pertaining to the origin and recovery of petroleum, and a complete list of publications, including technical papers published, or approved for publication, to June 1, 1932. Copies of the report can be secured from the American Petroleum Institute, 250 Park Avenue, New York. Price 50 cents.

Fewer Natural Gasoline Plants Have More Capacity

THE number of natural gasoline plants has shown a consistent decline in recent years, while the total capacity has increased steadily, according to Information Circular 6635, now ready for distribution by Section of Publications U. S. Bureau of Mines (no charge). "Natural Gasoline Plants in the United States, as of January 1, 1932," by G. R. Hopkins and E. M. Seeley. The number of completed plants, as determined by this survey was 959. Previous surveys of January 1, 1928, and 1930, shows 1155 and 1035 plants, respectively. Of the total plants on January 1, 1932, 859 were operating and 100 were shut down, compared with 999 operating and 36 shut down on January 1, 1930. The material gain in the number of inoperative plants in the last two years was probably due to the severe decline in prices in 1931. The majority of plants removed from the list in 1930 and 1931 were owned by companies which were engaged solely in the manufacture of natural gasoline.

The total daily capacity of the plants on January 1, 1932, amounted to 11,387,000 gallons, an increase of 871,000 gallons, or eight per cent, in the two years.

During 1931 the average total daily capacity of the operating plants was approximately 10,600,000 gallons, while the average daily production amounted to 4,944,000 gallons, indicating that the plants operated during 1931 at 47 per cent of their capacity, compared with 58 per cent in 1930 and 61 per cent in 1929.

Fourteenth Exposition Of Chemical Industries

THE Fourteenth Exposition of Chemical Industries will be held in New York during the week of February 27 to March 4, 1933. Grand Central Palace will again be the location and three entire floors will be devoted to the exhibits showing the newest developments in raw materials, machinery, and manufactured products. Already more than 179 companies have reserved space. The exhibitors represent over 40 American industries classified as chemical.

The Exposition of Chemical Industries, held every two years, provides an opportunity for studying the latest designs in a vast array of interesting equipment, and for comparing competitive products side by side. Some of these products, like ores and minerals, are obtained in nature, while others are the new synthetic materials which are a triumph of the research laboratories. Special groupings of exhibits are being made, such as: 1. General Equipment. 2. Chemicals and Chemical products. 3. Plastics, Molded Products, Lacquers, etc. 4. Laboratory Equipment and Supplies. 5. Instruments of Precision. 6. Containers and Packaging Section and Materials Handling equipment. 7. Raw Materials, Natural Resources and Industrial Opportunities; and 8. Educational Instructional exhibits.

The last exposition, which was held in 1931, was attended by 103,000 and more than 22,000 registered. Not only is the exposition invaluable to members of the chemical industry but it is also one of the most interesting shows which the business man is privileged to visit. Admission will be without charge, and by invitation or by registration only.

Motor Busses Use 2.84 Per Cent of Domestic Gasoline

MOTOR busses in 1931 used 2.84 per cent of total gasoline demand in this country, according to Information Circular 6639, "Economic Factors Influencing the Domestic Demand for Gasoline, Part 1—Revenue Motor Busses," by H. A. Breakey and E. B. Swanson, (available from the Section of Publications, U. S. Bureau of Mines, no charge). The report analyses the demand from the standpoint of the city bus and the inter-city bus.

As a factor in the determination of gasoline consumption the revenue (common carrier) motor bus was almost twice as important in 1931 as in 1925, (Number of busses 1925 was 23,800, and in 1931 the number was 45,400) accounting for nearly

three per cent of the total gasoline demand in 1931 as compared with 1.5 per cent of the 1925 demand. Quantitatively the calculated gasoline demand of revenue busses has increased from 3,391,000 barrels in 1925 to 11,468,000 barrels in 1931.

While the yearly mileage traveled by the average bus has increased, the greater gasoline demand is attributed principally to the decreased mileage per gallon of gasoline consumed. The use of larger busses is a contributing factor to the increase in gasoline consumption per bus-mile. Both the increased consumption per bus and the increase in number of busses account for the marked increase in gasoline consumption by city and inter-city busses.

Bureau Revising Mailing Lists

MAILING lists of the United States Bureau of Mines are being revised during the current month, and the Bureau has requested that it be furnished all information as to change of address and new names so that the work of revision may be soon completed. By writing to John A. Davis, Chief Engineer, Information Division, Bureau of Mines, Room 4064, Commerce Building, Washington, D. C., those wishing the service will have their names placed on the mailing list to receive the Monthly List, New Publications, United States Bureau of Mines. This monthly tabulation lists all sales publications, available from the superintendent of documents, government printing office, including bulletins, technical papers, economic papers, etc., for which small charges are made, and also lists the free publications, available only through Section of Publications, Bureau of Mines, and including reports of investigations, information circulars, mineral-market reports, safety reports, and the like. Thus all publications of the Bureau of Mines are listed monthly and those desiring copies can secure them from the division indicated.

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Revised Edition Gurwitch Petroleum Technology

IN collaboration, Harold Moore and C. I. Kelly have prepared a revised and new edition of Professor Gurwitsch's "Petroleum Technology, Scientific Principles." (D. Van Nostrand Co. Inc.) In response to a wide appeal for a second edition and no newer edition in German being available owing to the death of Professor Gurwitsch the preparation of the present work was undertaken.

Realizing that insufficient attention had been paid to the American developments, and as a very large portion of the technical and scientific work on petroleum during recent years has emanated from America, one of the primary objects in the preparation of the new edition was to remedy this deficiency. Considerable amplification of the chemistry and physics section was secured, and special attention has been paid to sections dealing with sulphur, acid treatment, detonation, motor fuels and cracking. Addition of an entirely new chapter will be found in the form of a treatment of the power factor of insulating oils, tube still distillation and hydrogenation of petroleum. The price of this work is $8.00 and it can be secured through the Gulf Publishing Company, Box 1307, Houston, Texas.

Petroleum Distillation Corporation Formed

FOR the purpose of overcoming difficulties which have arisen through diverse ownership of related and complementary patents, The Atlantic Refining Company, Standard Oil Company (Indiana), Standard Oil Company of New Jersey and Foster Wheeler Corporation have reached an agreement under which each of them will grant licensing rights to a common agent for the use of their fractional distillation patents.

To make this effective they have organized the Petroleum Distillation Corporation, incorporated in Delaware, with an

authorized capitalization of 2000 shares of no par value stock. This stock will be purchased by the owners of the patents, that is, Standard Oil Development Company, Standard Oil Company of New Jersey, The Atlantic Refining Company, Standard Oil Company (Indiana), and Foster Wheeler Corporation.

The officers are T. G. Delbridge of The Atlantic Refining Company, president; J. J. Brown of Foster Wheeler Corporation, and Robert E. Wilson of Standard Oil Company (Indiana), vice presidents, and these men, together with L. B. Nutting, of Foster Wheeler Corporation, E. R. Cox of The Atlantic Refining Company, B. K. Brown of Standard Oil Company (Indiana), F. A. Howard and W. R. Carlisle of Standard Oil Development Company, will be directors.

The new company has acquired licensing rights under the oil distillation patents of the three refining companies named and Foster Wheeler Corporation, and has made the last named corporation its agent for granting licenses under the distillation patents of all the companies interested.

During the last few years, the older methods of oil distillation have been largely replaced by new and more scientific processes, the most successful use of which involves the application of a large number of new inventions. The companies interested in the Petroleum Distillation Corporation have been leaders in the development of these new inventions and for some time past have been in negotiation in an effort to find a satisfactory basis under which each could use the complementary inventions of the others. The Atlantic Refining Company and Foster Wheeler Corporation entered into an arrangement of this kind some time ago. To make this agreement completely effective for its intended purpose of permitting the construction of the most efficient modern distillation units, it was found necessary to broaden the arrangement to include the other two companies. This resulted in the formation of the Petroleum Distillation Corporation, which by acquiring rights under patents of all the interested companies, becomes able to grant the necessary licenses not only to them, but also to all other refiners.

Experience of the interested companies indicates considerably reduced investment costs and appreciable savings in fuel, labor and repair costs by use of pipe stills embodying all of their important inventions. The intention of the Petroleum Distillation Corporation is to make all of their inventions available to all refiners on a uniform basis representing a small proportion of the savings effected.

Foster Wheeler Corporation in its capacity as agent for Petroleum Distillation Corporation will negotiate the necessary licenses and contracts with oil refiners.

PAUL D. BARTON

Alco Takes Barton to New York

PAUL D. BARTON, consulting engineer for Alco Products, Incorporated, a division of American Locomotive Company, was retained recently by that company when it acquired Jackson Engineering Company. He was graduated from Oklahoma University in 1919, and immediately afterwards moved to California where he attended the California Institute of Technology, graduating from that institution with the degree of Master of Science.

After completing the prescribed course in the California Institute, he accepted a position with the General Petroleum Corporation in the research division, continuing with that company until 1923 when he went with the United Oil Company to take charge of some of its gasoline plants as operating superintendent. As that company acquired additional manufacturing units, he was made head of the gasoline department.

In 1926, he organized a consulting engineering firm called Barton Company, and when Jackson Engineering Company was organized to design and erect gasoline plants and recovery units, he was retained by them as consulting engineer. When Alco Products, Incorporated, purchased Jackson Engineering Company, he was retained by that organization and transferred from the general office at Tulsa to New York.

Shoup Came Into Gasoline Manufacturing on a Truck

Frank Shoup started in the gasoline business in 1925 with Phillips Petroleum Company when it was constructing a plant at Norfolk, near Cushing. He was assigned to navigate a truck carrying supplies from the warehouse to location. Following the construction department to North Texas, he was driving a truck while the Olney plant was built. Immediately after the company's entry into the Texas Panhandle, Frank was transferred to that place, and he can tell a lot of tales about road conditions in the early days at Borger, days when snow piled up in huge drifts, days when the camp was marooned without supplies for the commissary or boarding house and volunteers were called for to make the 25-mile drive to Panhandle City to replenish the supplies.

After things smoothed out a bit he was transferred to the operating division and assigned to look after one of the charcoal recovery units operating on sour gas. After a few months, he was given charge of the plant which is now designated as the Carson plant. This plant has been remodeled and the charcoal unit is not in use at present, instead, a modern two unit absorption plant is on the original site, and as a consequence, his duites are much lighter.

FRANK SHOUP

PLANT ACTIVITIES

Vacuum Unit—Anderson-Pritchard Oil Corporation at Cyril, Oklahoma, will erect 1500 barrel vacuum distillation unit to handle pressure still tar from cracking units. Contract to Winkler-Koch Engineering Company.

Moved Plant—Empire Oil & Refining Company's "Wilson" Gasoline Plant, Seminole, Oklahoma, has been moved to the "Fish" pool, Wewoka, Oklahoma. Material moved consisted of building, engines, water storage tank, cooling tower, piping and accessories. Work included gathering lines, electric lines, etc. Work was done under general contract by the Stearns Roger Mfg. Company of Denver, Colorado.

Acquisition—Bannatyne Pipe Line & Refining Company, has taken over the small skimming plant at Collins, Montana, purchased last summer by Consumers Oil Company (operated in 1929 by Sterling Oil Company). P. L. Withers heads the new company and is also president of Conrad Refining Company, now building a small plant at Conrad, Montana.

Refinery—Transport Refining Company will build a refinery at Baca, McKinley County, New Mexico, on the A. T. & S. F. railroad, 15 miles southeast of Thoreau. C. P. Ritter, president, also heads Olympic Refining Company, Long Beach, California. The new company organized under the laws of Nevada, has an authorized capitalization of $1,000,000. Producing properties in McKinley County reported purchased from Midwest Refining Company.

Refinery—W. S. Fahner and J. A. Floyd of Casper, Wyoming, plan a 100-barrel skimming plant at Belle Fourche, South Dakota, to operate on Osage, Wyoming, crude.

May Resume — Sinclair Refining Company proposes re-opening Argentine, Kansas, refinery pending arrangements with Kansas City, Kansas, officials, who have been asked to remove the property from the city limits that it may be relieved of burden of city taxes.

Refinery — Admistracion Nacional de Combustibles, Alcohol y Portlandt, Montevideo, Uruguay, South America, is reported calling for bids by October 31, 1932, for equipment for proposed 2800-barrel refinery.

Stabilization — Shell Petroleum Corporation has let contract to Alco Products, Inc., for erection of gasoline recovery and stabilization system to be installed at the company's new Canadian refinery at Montreal East. (Ref. & N. G. M., March, 1932, page 72 A. and June, 1932, page 49A.).

Cracking Unit—Phillips Petroleum Company, has started construction of its new cracking equipment at the Kansas City, Kansas, plant, the unit to include new features in cracking such as much higher pressures. (Refiner and N. G. M. June, 1932, page 48A.).

Carbon Black — Magnolia Petroleum Company, Dallas, has been granted permit by Texas Railroad Commission to operate carbon black plant, Wheeler County, Texas, estimated consumption of 4,000,000 cubic feet of gas daily. Same company's request for like permit at Pampa held in abeyance pending investigation.

Merger—Consolidated Oil Corporation (Sinclair) has acquired Richfield Oil Company of California and all Eastern and Western subsidiaries (four refineries in California, total capacity 111,000 barrels) and at the same time consumated deal with Rio Grande Oil Company (refineries at Los Angeles, Phoenix, Arizona, and El Paso, Texas, total capacity 16,000 barrels) subject to approval of stockholders September 16. Richfield Oil Company operates Cross and Black cracking processes and Rio Grande Oil Company has Jenkins units.

Operating — Pilot Point Refining Company, Pilot Point, Denton County, Texas, (Wichita Falls area) has started operating its 500-barrel skimming plant. Company formed by J. C. Shrouder and Bruce Young, Grandfield, Oklahoma. (Ref. & N. G. M., July, 1932, page 49A.).

Stabilizing System—The Pure Oil Company, Muskogee, Oklahoma, refinery has let contract to Alco Products, Inc., for construction of new vapor recovery and stabilization system, to process about 5,500,000 cubic feet of gas daily from Cross and Gyro processes, distillation and tank gases.

Refinery — Dickey Oil Company, Wichita, Kansas, building 3000 barrel combination skimming-cracking plant at McPherson, Kansas, to run McPherson field crude. Roy Miller in charge of construction. George Dickey, president; Ellis Slack, Tulsa, vice president, marketing.

Operating—Cedar Grove Company, owned by Eugene Griswold, started operating its skimming plant on site of D'Artois Refinery, Cedar Grove, suburb of Shreveport, Louisiana. A. F. Kelly, superintendent.

Refinery Sale—Hercules Gasoline Company, Ltd., refinery, skimming-cracking (Jenkins), located at Vernon, California (Los Angeles) is being offered for sale by H. F. Laugharn, trustee, 633 Subway Terminal Bldg., Los Angeles, California. Capacity, 8000 barrels. Real estate valuation, $153,000.

Plant—W. O. Stowell (Breckenridge, Texas), and associates, have assembled material to erect a 100 barrel skimming unit near Mertzon, to process crude from Mertzon pool, Irion County, West Texas.

Enlargement—Imperial Oil, Ltd., Vancouver, B. C., reported soon to receive bids for extension of gasoline plant at Ioco, B. C., Canada, estimated cost $150,000. A. D. Grant, superintendent.

Construction — Conrad Refining Company, Conrad, Montana, reported planning new construction at refinery. P. L. Withers, president and general manager. Estimated cost reported $75,000.

Refinery — Asphaltic Oils, Ltd., Winnipeg, Manitoba, Canada, reported planning refinery to cost $50,000.

Refinery—Compagnie Francaise des Petroles, building refinery northern France, near Havre, has also acquired land for southern France refinery at Martigues. Plants built by subsidiary, Compagnie Francaise de Raffinage.

Reforming Unit — Empire Oil & Refining Company, at Ponca City, Oklahoma, is nearing completion of Dcherty type naphtha reforming unit, rated capacity, 3000 barrels. (Ref. & N. G. M., May, 1932, page 60A.).

Refinery — Edmonton interests, operators in the Wainwright field, Wainwright, Alberta, Canada, plan erection of small refinery, contingent upon success of deep test now drilling. Reported will use process known as Stillson.

New Unit—Anglo-Persian Oil Co. Ltd. has completed construction of a new vacuum distillation unit for production of lubricants at Llandarcy, England, refinery, according to company's annual statement. Company interested in plant in France now under construction.

Resumed—White Eagle Oil Corporation has resumed operations at Casper, Wyoming, refinery at 60 per cent capacity. Was closed for repairs and reduction of stocks.

Plant—Ohio Oil Company has installed a small plant for production of gasoline and tractor fuel at Mule Creek in the Lance Creek oil field, eastern Wyoming.

Gasoline Plant—Clymore Company, Inc., has been granted charter in Texas as refining and gasoline extraction concern, headquarters, Refugio. Incorporated by Garland Clymore, Gordon Shelton, of Refugio and W. L. Pearson, Houston.

Cracking Unit—Radio Oil Refineries of Canada, Ltd., Winnepeg, Manitoba, is reported planning erection of a cracking unit.

New Unit—Commonwealth Oil Refineries, Ltd. (Australian Government and Anglo-Persian Oil Company), at Laverton, Victoria, Australia, has completed construction of 2500-barrel distillation unit of Anglo-Persian design, cost $200,000. (Ref. & N.G.M. March, 1932, page 69A.)

Turkish Plant—U. S. S. R. (Russia) has received concession from the Turkish government for erection of refinery to process Russian oil, and tank farm, on the Bosporous, with negotiations still under way with City of Constantinople for acquisition of plant site, according to Petroleum World, London.

Refinery—Globe Oil & Refining Company, Blackwell, Oklahoma, according to F. J. Jehle vice president and general manager, will proceed with construction of 10,000-barrel refinery at McPherson, Kansas, at once. The project was announced last year. (Refiner & N.G.M. July, 1931, page 144.)

Cracking—Sinclair Refining Company is adding modern cracking facilities at Coffeyville, Kansas. (Ref. & N.G.M. May, 1932, page 61A.)

Resumed—Rusk Refining Company, Overton, Texas, has resumed operation of 2500-barrel skimming plant at Overton (East Texas field).

Refinery—H. & M. Refining Company, completed 500-barrel skimming plant at Gladewater, East Texas field, making total of four plants at Gladewater.

Modernize—Black Gold Refining Company, Oklahoma City, has let contract to Leader Iron Works for reconstruction of refinery and addition of high pressure distillation facilities.

Foster Wheeler Corporation has concluded an arrangement with Consolidated Steel Corporation, Ltd., by which the latter company takes over the entire western sales personnel of Foster Wheeler Corporation and will handle sales in California, Washington, Oregon, Nevada, Utah, Arizona and New Mexico. Consolidated Steel Corporation also will manufacture the equipment for this territory.

New Equipment for the Modern Plant

1. Vent Valve and Flame Arrester

VAPOR RECOVERY SYSTEMS CO.

Vapor Recovery Systems Company, Compton, California, announces an aluminum conservation vent valve and an aluminum entrainment separator flame arrester.

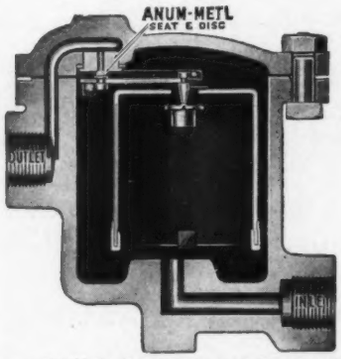
Heavy cast aluminum ends direct the flow of gas in streamline fashion so as to distribute the flow over the complete area of the bank. The arrester bank itself is of the cartridge type and consists of sheets which are corrugated both vertically and horizontally to effect a bumping of the gasoline laden tank vapors in passing through. Gasoline disseminated throughout tank vapors is in the form of actual molecules of liquid, which are separated by this article and are drained back into the tank.

According to the manufacturer, the flame arrester has been approved by the Underwriters Laboratories.

2. Bucket Traps

STRONG, CARLISLE & HAMMOND COMPANY

Strong, Carlisle & Hammond Company, Cleveland, Ohio, announce inverted bucket traps, Nos. 70 and 71, which use the anti-balancing principle.

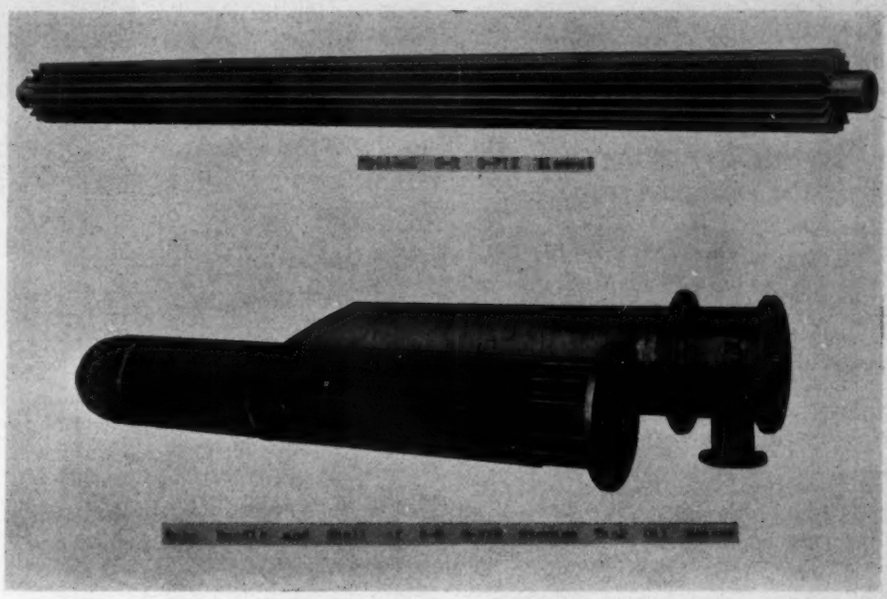


Strong, Carlisle & Hammond Bucket Trap

The principle of this device consists of a valve arrangement which replaces the conventional air vent hole in the bucket. This valve is so arranged that a very small vent is open while the trap is in the process of filling. As the bucket begins to lose weight the valve in the bucket is opened wide to permit a quantity of steam and air to escape suddenly. This steam and air is displaced with water which causes the bucket to suddenly lose its buoyancy, sinking and opening the trap discharge valve wide.

In the 70 Series traps, the bucket is suspended on a tapered spindle and the clearance between this spindle and the hole in the stainless plate on the bucket serves as the air vent. While the bucket is floating or in a filling position, the clearance is very small, but as the bucket starts to sink, this clearance increases rapidly and produces the effect described above. The manufacturers claim that the bucket moving up and down the tapered spindle prevents the air vent from becoming clogged with sediment or oil and these traps may be used satisfactorily on exhaust steam containing oil.

The discs and seats are made from Anum-Metl and the lever, pins and wear plate on the bucket are all made from a work-hardening steel which increases in hardness when subjected to shock, friction, or wear. No. 70 trap is made for pressures from 0 to 125 pounds and the No. 71 trap for pressures from 0 to 200 pounds, both with semi-steel bodies. No. 71 trap is also furnished with cast steel body and cover for pressures from 0 to 200 pounds. The steel bodied traps are especially made for installations where some superheat might be present at intervals.



Griscom-Russell Oil Tank Heater

3. Oil Tank Heater

THE GRISCOM-RUSSELL COMPANY

The Griscom-Russell Company, 285 Madison Avenue, New York, New York, announces a storage tank oil heater distinguished by a unique type of heating element which makes the unit particularly compact, effective and economical.

Patented G-Fin heating elements in this apparatus consist of a number of U-shaped steel pipes having longitudinal fins along the exterior surface of the straight portions of each pipe. These fins are equally spaced about the circumference of the pipe, and are securely fastened by a mechanical process without tinning or similar bond which would limit the operating temperature.

The purpose of the longitudinal fins is to increase the heat-transmitting surface on the outside of the pipes in contact with the oil to be heated for withdrawal from the tank.

The heater is installed with the shell

— — — — — — — — *MAIL COUPON* — — — — — — — —

REFINER AND NATURAL GASOLINE MANUFACTURER,
Houston, Texas, U. S. A.

Please see that I am supplied, without obligation, additional information on New Equipment Items Nos.....described in August, 1932, issue of REFINER.

Name .....

Company .....

Address .....

and heating elements extending into the tank and the steam, drain and oil connections outside the tank. Special provisions in the design of the unit facilitate flow of oil into and out of the shell. No cross baffles are necessary in the shell, thereby resulting in minimum pressure drop of the oil, and the construction of the unit throughout is simple, sturdy and leakproof.

4. Drum Reclaimer

METERJOL PRODUCTS, INC.

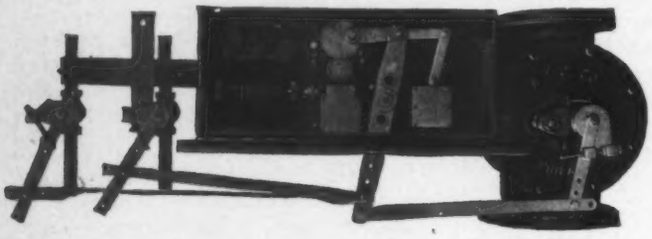
Meterjol Products, Incorporated, 350 Fifth Avenue, New York, N. Y., announces a standard drum reclaimer for internal cleaning and removing dents from all types of steel drums. The apparatus will, at the same time, according to the manufacturer, test the drum for pin-hole leaks in or near the chime.

5. Motor Operated Control

AUTOMATIC TEMPERATURE CONTROL COMPANY

Automatic Temperature Control Company, 34 East Logan Street, Philadelphia, offers the new "Type 303 Motor Operated Controller," which can be attached to the actuating instrument so as to obtain either a two or three position operation, depending on results desired.

Type 303 is mounted with one air and two fuel oil valves, insuring equal fuel distribution to both sides of the furnace. The manufacturers claim that with the ability to adjust its valves to one or two intermediate positions Type 303 can hold certain types of furnaces under very close temperature regulation, and do it automatically.



Motor Operated Controller

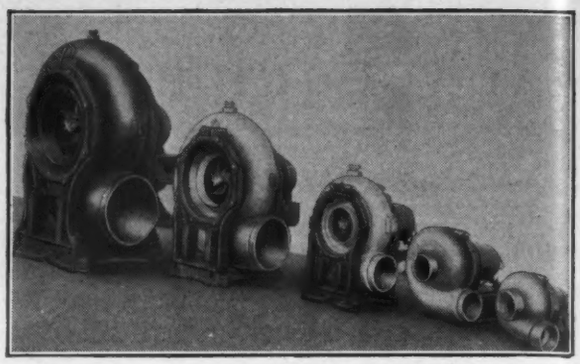
6. Proportioning Control

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

Proportioning Control

Minneapolis - Honeywell Regulator Company, Minneapolis, Minnesota, announces a new control system, known as proportioning. It consists essentially of a modified Wheatstone bridge circuit combining resistance with inductance to obtain at the motor, remote from the control instrument, a mechanical motion which is proportional to change of condition at the instrument. The latter operates a sliding contact on a very small resistance unit governing the position of a plunger in a little divided coil solenoid. This plunger moves a contact cooperating with "follow-up" contacts driven by the motor. The net result is that the motor takes up a position between chosen limits which is proportional to that of the control instrument contact. Furthermore the motor may operate valves, louvers, etc., to adjust conditions according to the action of the control instrument.

The Minneapolis-Honeywell Company is in a position to supply combination units wherein the motor and auxiliary mechanisms are contained within a practically air-tight housing. It is used in this self-contained form to operate suitable valves for the regulation of liquid or gas flow. Larger units may be assembled by combining a limit switch and balancing potentiometer unit with a suitable reversing motor and speed reducer of size required to drive heavier loads. A special proportioning relay which may be mounted in any desired location and if desired assembled in an explosion proof cabinet is employed in conjunction with units of this sort.



Showing complete line of acid resisting exhaust fans announced by The Duriron Company, Incorporated, Dayton, Ohio.

7. Special Gas Cylinders

THE LINDE AIR PRODUCTS COMPANY

The Linde Air Products Company, 30 East 42nd Street, New York, has announced that it is in a position to supply a full line of cylinders for the transportation of refrigerant gases such as Sulphur Dioxide, Methyl Chloride, Ethyl Chloride, Isobutane, Butane and Propane. The cylinders are suitable for portable or stationary use and are made strictly in accordance with the rules and regulations of the Interstate Commerce Commission.

A wide variety of standard cylinders is available but cylinders will be constructed in accordance with customer's specifications if special designs are desired. Standard cylinders are made under the following specifications:

Sulphur Dioxide	ICC—4B—300
Methyl Chloride	ICC—4B—150
Ethyl Chloride	ICC—4B—150
Isobutane	ICC—4B—150
Butane	ICC—4B—150
Propane	ICC—4B—260

The final numbers indicate the operating pressure.

The capacities of the small portable cylinders are one-eighth, one-quarter, one-half, three-quarters, one, 1¼, 2½, three and 3½ gallons. The outside diameters and lengths are made in accordance with the user's requirements. Larger transportation cylinders can be supplied in capacities up to 26 gallons.

Cylinders to contain carbon dioxide for use with chemical fire extinguishers are stock items and are made to ICC specifications three or 3A. They are suitable for operation at 2000 pounds per square inch working pressure.

Cylinders can be furnished with or without valves. A full line of valves, of various materials and design suitable for any gas application, is kept in stock.

8. Viscosimeter

AMERICAN INSTRUMENT COMPANY

American Instrument Company, 774 Girard Street N. W., Washington, D. C., announces a new and improved model of the Aminco Saybolt type Viscosimeter, similar in general to the previous models in use in such laboratories as the U. S. Bureau of Standards, the Army Air service and Motor Transport Corps, the Naval Research Laboratories, the Bureau of Public Roads, and many refiners and distributors of petroleum products, but presents various refinements and improvements in both the bath and the tubes.

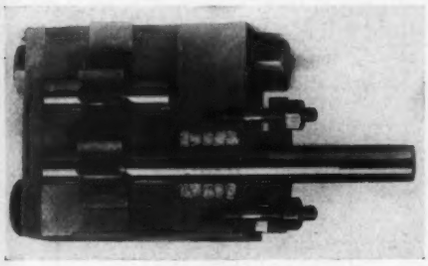
Bath temperatures are automatically maintained within plus or minus 0.1°F.

and a pilot light provides a visual check of thermostat performance. Improvements in the Viscosimeter tube permit the rapid changing of Universal and Furol orifices without draining the bath or removing the tube. The tube is essentially similar to the master tube built by the American Instrument Company for the American Petroleum Institute and kept in the vaults of the U. S. Bureau of Standards as the ultimate standard tube for the standardization of all Saybolt Viscosimeters.

9. Nitralloy Steel Pumps

NORTHERN PUMP COMPANY

Northern Pump Company, Minneapolis, Minnesota, announces a new line of X E Series Nitralloy pumps with capacities from one-fourth to 42 gallons per minute at 1200 r. p. m., designed for all types of oil services, including the handling of dirty crude oils and distillates at high pressures.



For pumping non-lubricating oils, Nitralloy steel pumps are equipped with nitralloy plate bearings similar to those shown.

Interesting features of the Nitralloy bearings used in these pumps include four steel dowels to align and insure rigid assembly, a Nitralloy shaft which is heat treated and ground, an ample depth stuffing box that is accessible, Nitralloy gears, and a solid steel pump body.

10. Circuit Breaker

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

Westinghouse Electric & Manufacturing Company, Pittsburgh, announces the AB "De-Ion" circuit breaker featuring the single closing handle, mechanical-trip-free, common trip, inverse-time overload, and instantaneous trip on short circuits.

The breaker uses the De-Ion principle of arc extinction for the replacement of open knife switches and air circuit breakers within their rating. They are made for low voltage, 50-225 amperes, 250 and

COLUMBIA BRAND

98%–100% CAUSTIC SODA

76% Na_2O

Solid—Flake

Ground—Liquid

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99%–100% SODA ASH

58% Na_2O

Light—Dense

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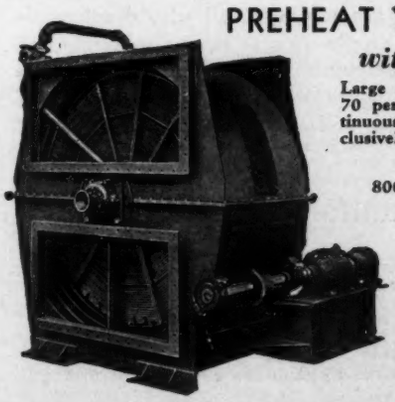

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with Heat from the Flue Gases

Large fuel saving and better combustion from any fuel. 70 per cent heat recovery possible only with the continuous regenerative counterflow principle used exclusively in the Ljungstrom Air Preheater.

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CONTINUOUS REGENERATIVE COUNTERFLOW

ROTO TUBE CLEANERS

built for Oil Still Tubes, 3″ I. D. *and up*

Roto Special 6-way Drill Head and Universal Joint.

Roto Air Driven Cleaner with Swing Frame Head attached.

Roto Combination Head and Universal Joint.

THE ROTO COMPANY

Sussex Avenue and Newark St., Newark, N. J.

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FULTON

"V-Port" Motor Valves

THE "V-Port" gradual opening valve here shown is most commonly used with flow controllers, temperature controllers, and instrument-type auxiliary controlled pressure regulators in oil refinery and various industrial applications. It can be furnished for either direct action, in which diaphragm pressure causes the valve to close, or indirect action, in which diaphragm pressure causes it to open. Sizes from ½-inch up are available, all with diaphragms of ample area to insure complete and dependable throttling action. Write for descriptive circular with table of types and sizes available.

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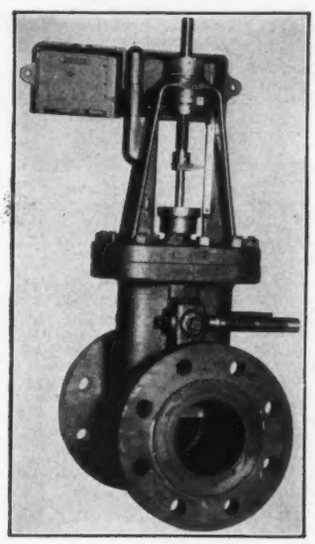
Manufacturers of a varied line of control appliances for the oil and gas industry.

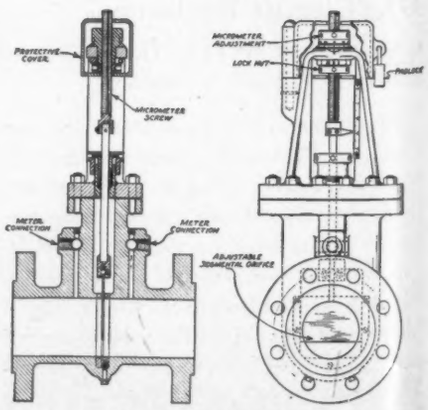
600 volts alternating current, and 125 and 250 volts direct current, and are available in one, two, three and four poles.

11. Adjustable Orifice

BAILEY METER COMPANY

Bailey Meter Company, Cleveland, Ohio, has designed the Bailey adjustable orifice for fluid meter installations where it is desirable to obtain accurate measurements over a wide range of capacity. This product is particularly suitable for use with meters measuring gas or low pressure heating steam, since on these services the desired capacity is often dependent upon the season. The adjustable orifice consists of a flanged body with integral meter connections. It can be readily installed in a steam, water or gas line and connected to any differential head type of fluid meter. The adjustable orifice functions similarly to the commonly-used fixed type of Bailey segmental orifice. A micrometer adjusting screw permits setting the height of the gate segment within .001 of an inch. When it is advisable to change the capacity of the meter, it is simply necessary to set the micrometer screw at the reading corresponding to the





Bailey Adjustable Orifice

desired maximum capacity, as obtained from curve sheets furnished with the orifice.

12. Burette Assembly

Yonkers Laboratory Supply Company, 515 W. 132nd St., New York, N. Y., announces a new portable burette assembly for dispensing volatile or other liquids as used in making heptane-octane mixtures in knock-testing laboratories.

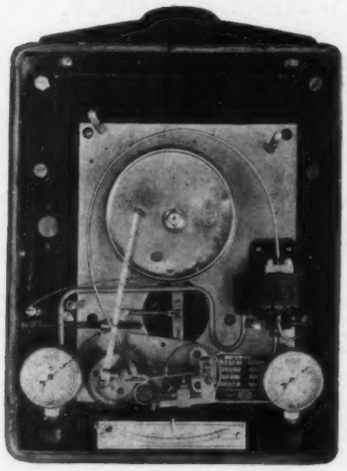
Features of the assembly are glass tube connections between reservoir bottles and graduated burettes, each tube joint, made of ground glass, being interchangeable and easily detachable. The fact that there are no rubber or cork connections tends to make frequent replacement of these parts unnecessary.

13. Flow Instrument

NEILAN COMPANY

Neilan Company, Ltd., 641 Santa Fe Avenue, Los Angeles, California, announces an improved line of flow control instruments, characterized by being fully compensated.

This is accomplished by the volupressure compensator which irons out pulsations without loss in sensitivity. Due to this simplified compensator, it is an easy matter for the average plant operator to obtain any degree of compensation that is required, according to the manufacturer.



Neilan Flow Control

Another distinct feature of the flow controllers is the ease with which they may be changed from one differential range to another. The high and low pressure mercury pots have been replaced by two concentric stainless steel cylindrical tubes. New differential ranges can be readily obtained by inserting new cylindrical tubes of the proper diameter. This provides conversion at a minimum expense while the stainless steel eliminates the possibility of inaccuracy due to corrosion.

14. Two-Ply Stainless Steel

INGERSOLL STEEL & DISC COMPANY

Ingersoll Steel & Disc Company, Chicago, Illinois (a division of the Borg-Warner Corporation) have perfected a two-ply stainless steel, known as "Ingloclad" Stainless Steel, which is produced by a patented process from the composite ingot. It is applicable where corrosion is a menace, and may be deep drawn, stamped, welded, formed and polished. It is being produced in various gages and is available in all practical commercial sizes. The metal may be used for pump parts, still linings, tank car linings, castings, fractionating column plates, bubble caps, etc. The manufacturing process has been developed to the point where a perfect bond between the stainless steel and carbon steel is assured.

15. Bar Stock Valves

READING-PRATT & CADY CO.

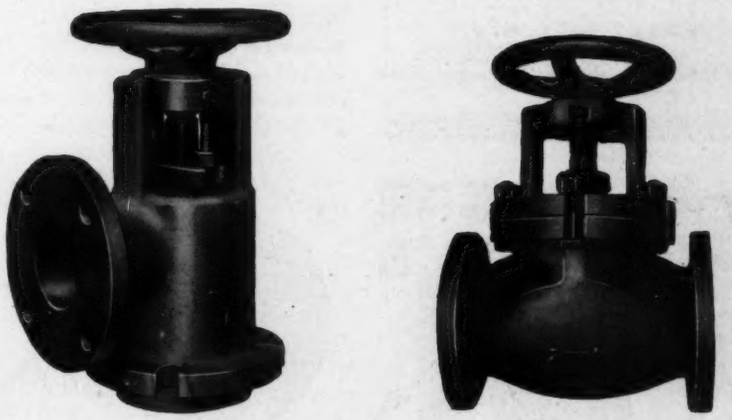
Reading-Pratt & Cady Company, Incorporated, Bridgeport, Connecticut, offers three-quarter-inch and one-inch globe valves which are precision turned from high grade carbon steel—an addition to their regular line of bar stock valves.

These valves have stainless steel, slip-on renewable discs and stainless steel screw-on seats. The stems are

Carolina Acid Valves

Substantial, Durable Valves for Handling Acids. Made of Lead Alloy, Special Cast Iron and of Various Alloys to Suit Acid Conditions.

Designed by Engineers familiar with refinery and acid plant conditions.



CHECK THESE ADVANTAGES:

1. Renewable plugs and stems.
2. Renewable seats.
3. Rising stem with very short travel.
4. Extra long stuffing box, can be packed while in operation.
5. Studs for packing glands operate from top of yoke so they will not come in contact with acid in case of leak around stuffing box.
6. Extremely heavy construction and durable.
7. No sticking.
8. That part of the valve stem that has been in the acid does not protrude above the stuffing box.
9. Absolutely acid resisting packing.
10. Various alloys to suit your acid conditions.

MATERIALS AND EQUIPMENT FOR ACID PLANTS

The following is a partial list:

Acid Valves, Acid Pumps, Acid-proof Cement (Ready Mixed), Chemical Brick, Silicate of Soda, Quartz for Acid Packing, Lead Alloy Plugs and Seats, Automatic Cut-Off Valves, Oil and Gas Burners, Acid Airlift Systems, Special Alloy Equipment, Chemical Putty, Charlite Cleaners.

PATENTS PERFECTED AND MARKETED

Your Inquiries will be Appreciated

Charlotte Chemical Laboratories, Inc.

MAIN OFFICE AND PLANT — CHARLOTTE, NORTH CAROLINA

KERLOW
GRATING PRODUCTS

Square and Triangular Mesh

Floor Gratings and Stair Steps

The strongest and lightest

Bridge and Floor Slabs
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Hy-Speed ELECTRIC MIXERS

For Mixing:
Lubricating Oils
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Lime and Oil
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Fuller's Earth and Oil
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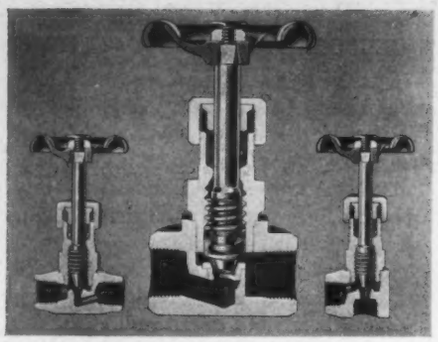
All Liquid Chemicals

"Hy-Speed" Portable Electric Mixers blend, compound, mix or agitate all oils and liquid chemicals . . . better and more economically.

They clamp to any tank or vat . . . require no installation. Capacities from 5 to 50,000 gallons.

Write for your copy of our new catalog today!

ALSOP ENGINEERING CORP.
39 West 60th Street, New York City



Reading-Pratt & Cady Bar Stock Valve

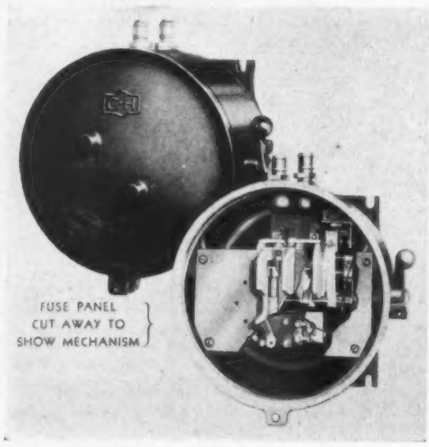
especially designed and treated for temperature service. All other parts are Parkerized inside and out.

Smaller sized carbon steel valves, in both the globe and angle patterns, have integral seats and discs—otherwise they are similar to the larger valves. The working pressures are 4000 pounds at 150 degrees1 Fahrenheit, 600 pounds at 500 degrees Fahrenheit.

16. Explosion-Proof Control

CUTLER-HAMMER, INCORPORATED

Cutler-Hammer Company, 418 North 12th Street, Milwaukee, Wisconsin, announces a new, air-brake type of D. C. explosion-proof, across-the-line, manual control, approved and rated "permissible" by the U. S. Bureau of Mines.



Explosion Proof Control

These two-pole starters have thermal overload and low-voltage protection and are rated four horsepower at 230 volts, and five horsepower at 550 volts. A main line fuse is built directly into the case which is made of cast iron and has a screwed-on cover. The overload when tripped is reset by the outside operating lever.

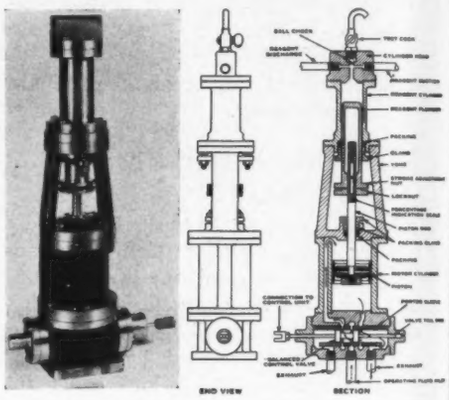
BURRELL-MASE ENGINEERING COMPANY
Design, Construction, Valuations, Tests, Reports, Researches.
Law and Finance Building
PITTSBURGH, PA.

17. Injection Controller

PROPORTIONEERS

Proportioneer, 7701 Avalon Avenue, Chicago, Illinois, announce an injection controller called Tret-o-Unit so designed that the mechanism responds to the through-put of the line to which it is attached. It is for controlling injection of accurate percentages of chemicals or reagents in treating operations or for securing accurate samples of fluids.

The assembly consists of a hydraulically balanced control valve, shuttled back and forth so as to control the number of strokes taken per minute by the small



Injection Controller

fluid motor located immediately above the shuttle valve. The motor is direct connected to a single stroking plunger pump, which creates necessary suction and discharge to pick up the reagent from any receptacle, build it up to pressure, and discharge it into the untreated fluid line.

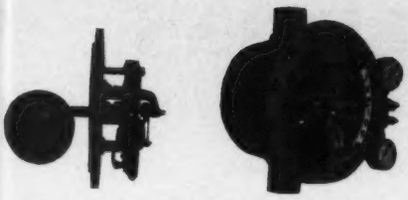
The access yoke contains the reagent plunger adjusting and locking device, so that dosage may be adjusted by changing the length of the plunger stroke. Ratios from a few parts per million up to normal reagent percentages may be handled with equal facility, according to the manufacturer.

18. Liquid Level Control

SHAND & JURS COMPANY

Shand & Jurs Company, Berkeley, California, announces an improved type of liquid level control. This control has several new features, principal of which is a thrust bearing on the shaft which prevents the exertion of undue pressure against the packing and glands. A novel scheme of application of the connecting link permits the reverse acting condition of the control

Electrically Driven Centrifuges
Hand Centrifuges
WRITE
WILLIAMS, BROWN & EARLE, Inc.
Manufacturers of Laboratory Apparatus
918 Chestnut St. Philadelphia, Pa.



Shand & Jurs Liquid Level Control

by taking the screw out of the link on the indicator point and placing it in another location. The rise in fluid causes a control to open a valve. By a change in linkage, the rise in fluid will cause the control to close the valve. The air valve is super-sensitive and will maintain either constant level or variable level under severe conditions. Instead of using a pot the control mechanism is mounted on the plate of required dimension to fit the manhole or container nozzle, and belted directly onto this opening.

19. Steam Hose

THE B. F. GOODRICH RUBBER COMPANY

The B. F. Goodrich Rubber Company, Akron, Ohio, has put on the market recently a new Type 26 steam hose carrying an insertion of braided asbestos, combined with wire, made in maximum lengths of 50 feet and in sizes from one-half to 2½ inches, inclusive.

The manufacturer claims that under a series of tests conducted under 140 pounds saturated steam results were in part as follows: The tube remains soft up to 2000 hours continuous steaming; resistance to burst in the two-inch size can be obtained as high as 1000 pounds under hydrostatic pressure.

Goodrich Steam Hose

20. Testing Sieve Shaker

NEWARK WIRE CLOTH COMPANY

Newark Wire Cloth Company, Newark, New Jersey, has announced a new testing sieve shaker for testing the fineness of cement, sand, gravel, fuller's earth and contact clays.

Newark Sieve Shaker

The manufacturer claims the following features of design for the shaker: elimination of most of the variable factors in sieve testing; the sample is spread uniformly over the whole surface of the sieve and the entire sieve surface is constantly utilized; jumping and bouncing of the sample particles is eliminated; noise and wear and tear on parts minimized.

21. Stainless Steel Castings

TEXAS ELECTRIC STEEL CASTING COMPANY

Texas Electric Steel Casting Company, Houston, Texas, licensed producers in the Gulf Southwest of Krupp-Nirosta Company's patented process heat and corrosion resistance castings, commonly known as the stainless steels, has developed a number of new applications for refineries, among which is a still tube plug.

The new plug is regular standard design, the new feature being in the application of the metal of this analysis. The principal alloying elements are chromium and nickel. The maximum resistance to temperature and corrosive chemicals is developed by heat treatment of the castings, according to the manufacturer.

Originally this same material was used experimentally in making liners for hot oil pumps, results of which were sufficiently satisfatcory that it was decided to try other applications. Owing to the properties of this metal it lends itself for use in similar equipment where the elements of temperature and corrosion are encountered.

22. Electric Lantern

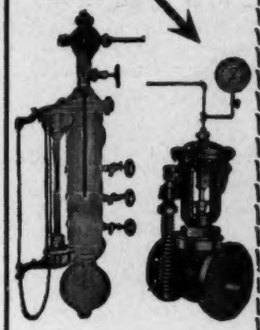
ECONOMY ELECTRIC LANTERN CO.

Economy Electric Lantern Company, 325 West Huron Street, Chicago, Illinois, announces the Model 40-UV Ecolite lantern which, according to the manufacturers, has been listed by the Underwriters' Laboratories for use in hazardous locations, Group D, Class 1, and also for casualty, fire and accident hazards.

The ONLY

boiler feed water regulator equipped with an indicator. The arrow is pointing at it.

Patented



But the indicator is only *one* of the reasons why refinery engineers are so enthusiastic about the

CAMPBELL

Steady. Reliable. Efficient. Economical. No floats. No thermostats. No generators. No links. No moving parts in the regulating element. No fine adjustments. Fully guaranteed. Use the coupon at the right, or, write a letter.

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ATLAS VALVE CO., 275 South St., Newark, N. J.

Without the slightest obligation, please send information, including price, on the following Atlas products:—

- ☐ Campbell Boiler Feed Water Regulator
- ☐ Pump Governors
- ☐ Float Valves
- ☐ Swing Joint Fittings
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- ☐ Reducing Valves
- ☐ Balanced Valves
- ☐ Damper Regulators
- ☐ Control Valves
- ☐ Temperature Regulators

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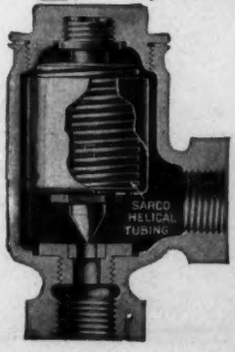
SARCO

STEAM TRAP

Simply screw the Sarco Steam Trap into your pipeline. It is self-adjusting for pressures from 0 to 100 lbs. That saves time. Saves work. It drains all condensation as soon as formed. Doesn't leak—doesn't waste steam. Cannot air bind.

It costs about one-third the price of big bucket or float traps. Sold on 30 days' free trial. Booklet S-95 on request.



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Branches in Principal Cities

CATALOGS . . . BULLETINS

Helpful Publications Which Manufacturers Will Be Glad to Send Free for the Asking

Lathe

South Bend Lathe Works, 426 East Madison Street, South Bend, Indiana, has published Circular No. 8, describing a new eight-inch bench lathe for general utility work with wood and steel.

Bearings

Hyatt Roller Bearing Company, Newark, New Jersey, recently issued a two-color, illustrated, 80-page book titled "40 Years" which tells by word and picture the story of the growth of the concern, the manufacturing processes of its various types of bearings, and describes the company's products. An important feature of the book, which celebrates the company's fortieth birthday, is that it details performance of the bearings.

Reversible Hydraulic Equipment

Murphy Tool Company, Inc., 5206 Navigation Boulevard, Houston, recently issued Catalog No. 27, devoted to reversible hydraulic equipment and parts and attachments therefor. Among the articles illustrated and described are a portable 12-ton reversible puller, a gear pulling yoke with pulling rods, an 18-ton puller, liner pulling attachments, valve seat puller attachments, 25- and 35-ton pullers, 50- and 70-ton pullers, and press stands.

Transformers

Wagner Electric Corporation, 6385 Plymouth Avenue, St. Louis, Missouri, has released Bulletin No. 172, devoted to transformers. The bulletin, 54 pages and illustrated, includes all types of distribution transformers, construction features of which are illustrated and described in detail.

Circuit Breakers

Westinghouse Electric & Manufacturing Company, Pittsburgh, has issued two bulletins on De-Ion circuit breakers for low voltage and from 50 to 225 amperes. This type of circuit breaker is covered in Bulletins C 1937 and C 1939.

Gages

The Hays Corporation, Michigan City, Indiana, has recently published a new catalog, No. PGA-32, covering in pictures and detailed description the corporation's complete line of pointer gages for draft, pressure and differentials. This catalog describes the operating mechanism of all three types, "V," "F," and "J," and an operation consisting essentially of a slack leather diaphragm and a phosphor bronze cantilever spring attached to a pointer which is mounted on a pivot bearing. The diaphragm is described as a pliable, tough, gas-tight membrane, and transmits the force of the draft or the pressure to the flat bronze spring which in turn moves the counterweighted pointer, producing a reading on the scale in a direct proportion to the magnitude of the force.

Indicator Recorder

C. J. Tagliabue Manufacturing Company, Park and Norstrand Avenues, Brooklyn, New York, has issued Catalog No. 1025, which fully describes and illustrates the new Tag-Mono indicator-recorder, a new all metal automatic flue gas analyzer.

Refractory Cement

E. J. Lavino & Company's refractories division, Bullitt Building, Philadelphia, has issued Bulletin 1-21-1, titled "Wetkrome," which regards the product of that name, a wet, ready-mixed, ready to use chrome ore cement. The little bulletin tells what Wetkrome is, how it is made and gives details of its uses to hold and preserve bricks, regardless of temperature.

Cooling Towers

Marley Company, 1737 Walnut Street, Kansas City, tells the story of Marley forced draft spray cooling towers in an eight-page bulletin, recently off the press. The bulletin is profusely illustrated to show in complete form every angle of this new cooling phase.

Pipe Fittings

Taylor Forge and Pipe Works, P. O. Box, 485, Chicago, Ill., announce "Taylor Forge" describing the various products for use in the oil and gas industry. These include, forged steel pipe fittings, welded pipe, spiral pipe, boiler nozzles, still flanges, steel rings, etc.

Air Cooled Transformers

Air-Cooled Transformers is the subject of a new loose-leaf bulletin sheet issued by the Wagner Electric Corporation, 6385 Plymouth Avenue, St. Louis, Mo. It describes Wagner types AC and AA units in sizes 1 to 50 Kv-a., voltages 100 to 600—and also discusses their application. Ask for Part 4B of Bulletin 172.

Expansion Joints

Croll-Reynolds Engineering Company, 17 John Street, New York, has for distribution an eight-page, illustrated bulletin titled "Flexodisc Expansion Joints," featuring packless expansion joints suitable for a variety of conditions including high temperature steam or corrosive fluids.

Booster Compressor

York Ice Machinery Corporation, York, Pennsylvania, has for distribution Bulletin No. 32164 describing a booster compressor for use in oil refineries and natural gasoline plants.

Welding

Metal & Thermit Corporation, 120 Broadway, New York, New York, has for distribution a new booklet which describes the welding of mild steel and boiler plate, stainless steel alloys, manganese steel, high carbon steel and stainless iron. The building up of railway rail ends, special manganese track work as well as the repair of castings and heavy parts is also covered.

Flanges

Harrisburg Pipe and Pipe Bending Company, Harrisburg, Pennsylvania, has recently published for distribution a 32-page, illustrated catalog titled "Harrisburg Drop Forged Flange Facts" containing descriptions of low hub flanges, Van Stone flanges, slip-on flanges, butt welding flanges, blind flanges and Ludlow flanges.

Wire Cloth Handbook

Newark Wire Cloth Company, Newark, New Jersey, announces a new general catalog No. 32, a sort of a "handbook" on wire cloth and wire cloth products. An outstanding novel feature of the book is a glossary of wire cloth terms.

Chemicals

The Columbia Alkali Corporation, Empire State Building, New York, New York, has for distribution a booklet titled "The Products of Columbia Alkali Corporation" which contains details on soda ash, modified sodas, calcium chlorides, special alkalies and other chemicals.

Condensing and Cooling Sections

National Radiator Research Department, Corporation of Johnstown, Pennsylvania, has issued a new bulletin, entitled Report CP-6, describing features of design and construction of the new National Condensing and Cooling Sections, giving the results of tests made on these sections and sections of conventional types.

Worthington Pump and Machinery Corporation, Harrison, New Jersey, announces availability of the following list of new catalogs and bulletins:

Portable Compressors, and Contractors Air Tools—four-page bulletin W-850-B8, illustrating complete line of equipment.

Rock Drills—four-page bulletin W-1201-S1A describing hand-held drills for light, medium and heavy duty.

Hydraulic By-pass and Check Valves—two-page bulletin D-445-S2, showing cross-section views and listing sizes and capacities.

Steam Pumps for Highly Volatile Liquids—eight-page bulletin D-111-S4 describing the Hi-VoL close clearance pump and giving simple method for calculating the actual clearance of any steam pump.

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Gentlemen:

Please send to me, without obligation, free booklet described in the August, 1932, issue of REFINER AND NATURAL GASOLINE MANUFACTURER.

NAME .....

COMPANY .....

ADDRESS .....

Chromium Steel Tubes

Babcock & Wilcox Company, Beaver Falls, Pa., has prepared a 16-page bulletin, "Four to Six Per Cent Chromium Steel Tubes and Pipe," presented in technical style the advantages of that type of tubes and pipe, giving recommended use and complete chemical and physical characteristics.

Process Plants

Babcock & Wilcox Company, 85 Liberty St., New York, has ready for distribution a new condensed catalog describing modern equipment for power, industrial and process plants including discussions of Mercury-Vapor, Diphenyl and Diphenyloxide as heat-transfer mediums.

Mixer Head

Martin-Decker Development Company, Ltd., 3441 Cherry Avenue, Long Beach, California, is distributing a bulletin covering details of construction, uses, and reduced price of the Master Mixer Head, employed in chemical treating, for agitation, air reduction of oils, transfer at stills, compounding and blending.

"Nickel Steel Topics"

The International Nickel Company, Inc., 67 Wall Street, announces the first issue of a bimonthly, illustrated, miniature newspaper called "Nickel Steel Topics," which will be devoted exclusively to nickel alloy steels and contain technical and semi-technical and news articles dealing with the production, treatment and uses of these steels.

Welded Steel Parts

Lukenweld, Incorporated, Coatsville, Pennsylvania, has a 24-page illustrated bulletin describing the use of welded steel parts in various types of machinery and equipment.

Refrigeration

York Ice Machinery Corporation, York, Pennsylvania, has ready for distribution an interestingly written excellently illustrated and valuable book "Cold Magic" dealing with various applications of refrigeration to industrial needs.

Optical Pyrometer

Bacharach Industrial Instrument Company, 7006 Bennett Street, Homewood Station, Pittsburgh, Pa., has ready for distribution an interesting discussion of optical pyrometry and the application of its H-K. Optical Pyrometer for the measurement of temperatures by sighting the instrument upon the object heated, and in ranges from 1100 to 2600° F. and 220 to 3700° F. It is applicable to determination of furnace fuel bed, and furnace wall temperatures, and the temperature of any glowing material.

Pipe Saver

Sarco Company, Inc., has ready for distribution a bulletin describing its new flanged Pipe Saver which comes in sizes from one-half inch to eight inches ready for installation without expansion tools.

Temperature Measurements

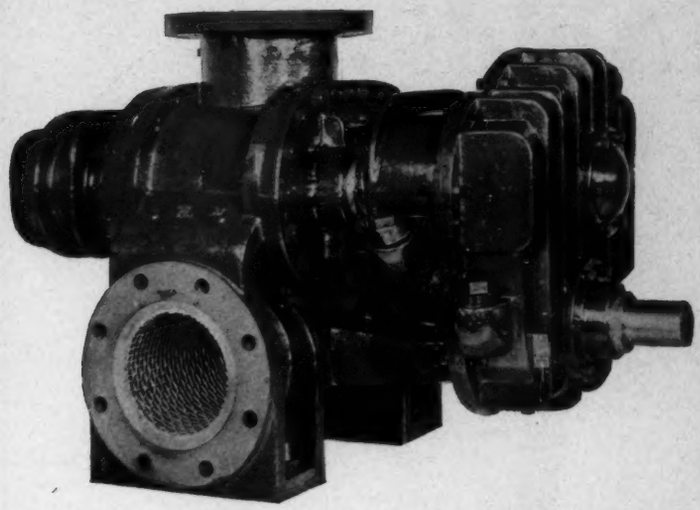
Leeds & Northrup Company, 4901 Stenton Avenue, Philadelphia, Pennsylvania, has for distribution Bulletin No. 871, a 28-page illustrated catalog titled "Temperature Measurements in Generators, Transformers and Cable Systems."

Motor Pump

Ingersoll-Rand Company, Phillipsburg, New Jersey, has for distribution a folder describing a new line of motor pumps ranging from one quarter to 25 horsepower, with capacities ranging from five to 800 gallons per minute, suitable for any type of fluid.

WATEROUS

HEAVY DUTY ROTARY PUMPS

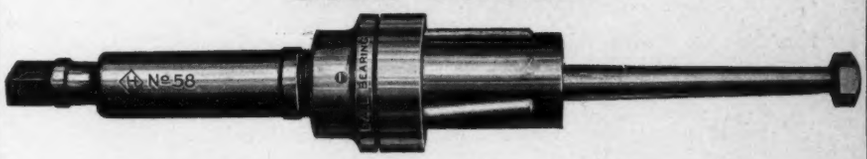


The design of the Waterous Rotary Pump is thoroughly proven. There are no weak spots or "bugs" in this pump. Send for catalog. WATEROUS COMPANY, St. Paul, Minnesota. Agents in principle cities. Also manufacturers of the Waterous Fire Hydrant.

WATEROUS COMPANY, St. Paul, Minnesota

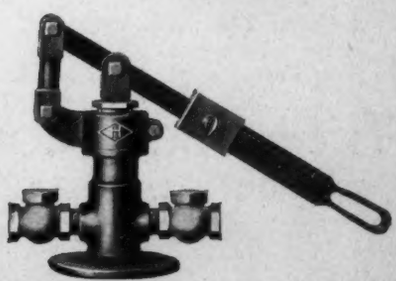
Waterous Dependable

Heavy Duty Expanders for Still Tubes



Tools for the Oil Industries

Hydraulic Pressure Pumps, 8000 pounds
Tube Expanders for Cracking Still Tubes
Hydraulic Pressure Pumps, 2000 pounds
Tube Expanders for Condenser Tubes
Hydraulic Pressure Pumps, 500 pounds
Tube Expanders for Steam Boilers
Screw Punches for Structural Shapes
Tube Expanders for Pipe Work
Screw Punches for Plate Work
Flaring Tools for Still Tubes
Beading Tools for Still Tubes
Hydraulic Jacks
Hydraulic Punches



A. L. HENDERER'S SONS

Wilmington, Del.
Established 1870
Expanders since 1884

Caustics . . . Acids . . .

. . . this LA BOUR Valve Isn't *Particular*

Here's a corrosion resistant valve that takes what you hand it. Most of the acids (outside of the chlorine group) and practically all caustics can be handled, if necessary, with one and the same valve.

Think what this means in standardization of equipment, in salvage value when a new process forces you to make plant changes. Maybe you have a layout now that puts two widely different chemical agents on opposite sides of the valve. This LaBour will stand the gaff.

Renewable plug and seat can be changed without taking the valve from the line. Write for Bulletin 35 to learn *all* the advantages of LaBour Chemical Valves.

THE LA BOUR COMPANY, INC.

807 Sterling Avenue
ELKHART, INDIANA

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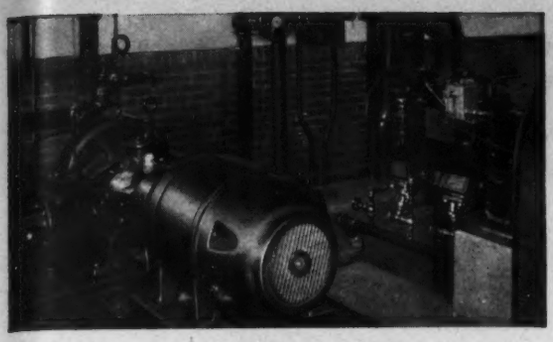
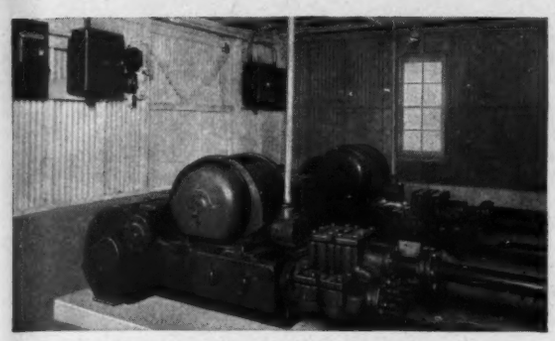
"TOUGH SPOTS!"

INDOORS and out, there are always tough spots — places where operating conditions are particularly adverse—where motors must withstand more than the usual amount of punishment.

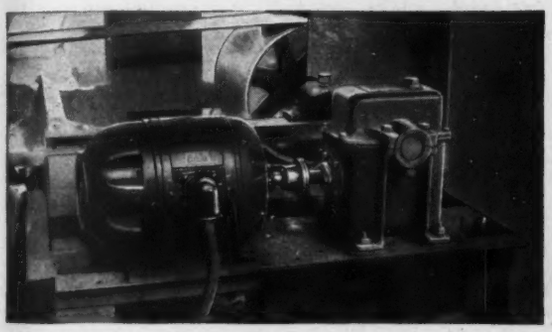
General Electric builds motors — induction and synchronous —designed to minimize maintenance difficulties usually experienced in operating motors under unfavorable conditions. How about the tough spots you must motorize? Remember: General Electric can build the RIGHT MOTOR and the RIGHT CONTROL for every application. For details, address your nearest G-E office, or General Electric Company, Industrial Department, Schenectady, New York.



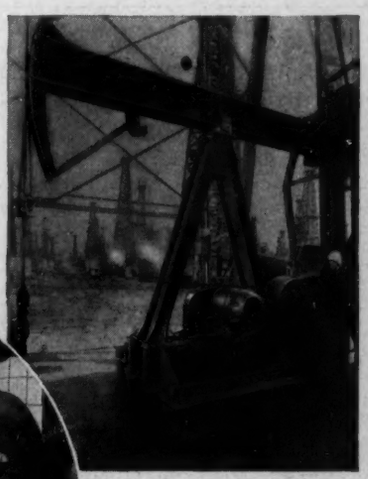
G-E explosion-proof motor driving centrifugal gasoline pump



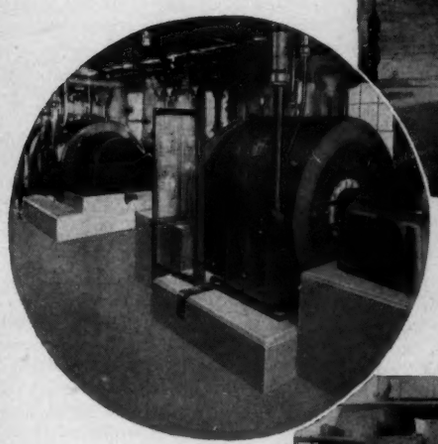
Two G-E splash-proof motors driving gathering pumps



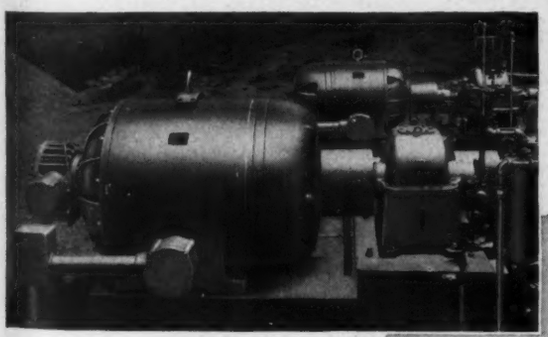
G-E totally enclosed, fan-cooled, squirrel-cage motor driving conveyor under fuller's earth burner



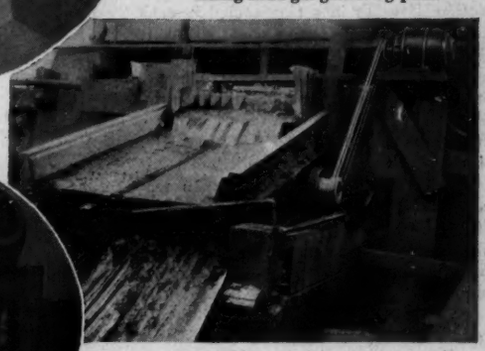
Outdoor installation, G-E explosion-proof motor driving oil-well pumping unit



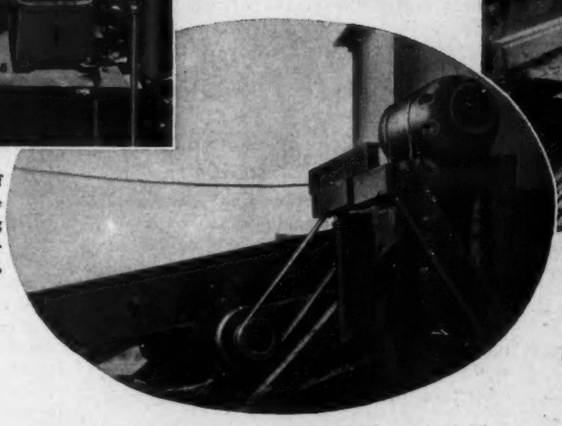
Two G-E totally enclosed, fan-cooled, inert-gas-filled synchronous motors in casing-head-gas gathering plant



Foreground, G-E 100-hp. synchronous motor of Class I, Group D, construction driving gasoline and reflux pumps through G-E speed-increasing gear; background, standby unit with G-E 75-hp. totally enclosed, fan-cooled, explosion-proof, squirrel-cage motor. Outdoor installation.



G-E single-phase explosion-proof motor driving mud screen, outdoors



G-E totally enclosed, fan-cooled, squirrel-cage motor driving mud screen, outdoors

200-614

GENERAL ELECTRIC

SCIENCE AND TECHNOLOGY

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REFINER AND NATURAL GASOLINE MANUFACTURER
by
THE LESLIE LABORATORIES
Traver Road, Ann Arbor, Mich.
under the supervision of
DR. E. H. LESLIE and DR. H. B. COATS

The abstracts here presented are selected from the current literature of science and technology to afford reference to fundamental information not easily available to all readers. Abstracts of articles appearing in readily obtainable trade journals are not included.

Photostat copies of original articles will be supplied at cost by the Leslie Laboratories. Complete or limited bibliographies covering special topics by title, by abstract, or in complete manuscript, will also be prepared and furnished at reasonable cost by the Laboratories.

Fundamental Physical Data

Critical Temperatures of Petroleum Oils. G. L. EATON and C. A. PORTER, *Ind. Eng. Chem.* **24** (1932) pp. 819.

A method of determination of critical temperature was used in which the sample was stirred to assure equilibrium between the phases. Gasolines, kerosene, gas oils, a lubricating oil, and several crude oils were studied. Results are compared with those of other workers. An equation is given from which the critical temperature can be calculated if sp. gr. and A.S.T.M. 50 per cent point are known. The equation agrees closely with all available data on pure compounds and on petroleum fractions. The data are presented in graphical as well as tabular form. A bibliography of 11 references is indicated.

Solubility of Water in Mineral Oils. A. E. FLOWERS and M. A. DIETRICH, *Power* **75** (1932) pp. 232-4.

A spindle oil, a medium and two heavy turbine oils, and two insulating oils were saturated with water at general temperatures. Water was then determined by distillation at 1 mm. Hg. and collection of vapor in a trap cooled in a CO_2 snow-acetone bath. The water was then distilled from the trap and collected in P_2O_5. The solubility of water increases rapidly with temperature, even at moderate temperature and more rapidly above 50°. The solubility of water in some oils at 100° was more than 620 parts per million. No single characteristic of the oil has a predominating effect on water solubility. An approximate relationship exists between water dissolved at 100° and the A.S.T.M. steam-emulsion number. When spindle oil was treated with 2 per cent fine fullers earth at 120°, the steam emulsion number dropped from 105 to 25 sec. and the solubility of water in the oil was halved. Water is reabsorbed from the air by a dehydrated oil. Insulating oils purified at high temp. can lose half of their dielectric strength because of precipitation of dissolved moisture on cooling.

The Smoke-Flash-Fire Points of Certain Fixed Oils. W. H. DICKHART, *Am. J. Pharm.* **104** (1932) p. 284.

Data were taken by use of the Cleveland open cup. Values are not averages from a number of samples and are approximate only. The smoke-flash-fire points of some oils are: rape seed (3 samples) 256-680-692, 412-600-692, and 332-594-692; rape seed (English) 390-614-692; lard oil 288-492-610; acidless tallow 605-695; tallow (2 per cent f.f.a.) 350-545-675; red oil 260-368-414; sperm 130-510-672; pine 153-184. Data on a number of other oils are given.

Chemical Composition and Reactions

The Number of Structural Isomers of Certain Homologs of Methane and Methanol. D. PERRY, *Jour. Am. Chem. Soc.* **54** (1932) pp. 2918-20.

A method is given for calculating the number of structural isomers of the paraffins, and the number of isomers is given for compounds from C_{19} to C_{60}. Reference is made to the work of Henze and Blair (Jour. Am. Chem. Soc. 53 (1931) p. 3077) on this subject and several corrections are given.

Formation of Peroxides in the Oxidation of Hydrocarbons. P. MONDAIN-MONRAL. *Chim. et Ind.* **27** (1932) pp. 770-4.

Air and octane vapor were passed through a heated tube into a cooled flask. At 270°C. a reaction commenced that resulted in white clouds of vapor difficult to condense. The temperature rose and aldehydes and CO_2 were present. The condensate formed separated into two layers, the lighter of which consisted of aldehydes, alcohols, and octane and the heavier of substances insoluble in hydrocarbons, water, and alcohol but which are energetic oxidizers. Heated to 200°C. the heavy layer decomposed explosively. The authors regard the results of this and their engine work as substantial confirmation of the peroxide theory of knocking.

Explosive Gaseous Reactions in a Dynamic System. S. P. BURKE, C. F. FRYLING, and T. E. W. SCHUMANN. *Ind. Eng. Chem.* **24** (1932) pp. 804-11.

The oxidation of propane was studied experimentally under such conditions that the effect of pressure, gas concentrations, rate of gas flow, and reaction of tube diameter and length could be determined. A theoretical and mathematical analysis of the reaction phenomena is presented. The results of this are in good agreement with those of experiment. The application of the method of theoretical analysis to the study of other types of explosive reactions is suggested.

Relation Between the Constitution and Anti-Knock Value of Hydrocarbons. F. HOFFMAN, K. F. LANG, K. BERLIN, and A. W. SCHMIDT. *Brenn.-Chem.* **13** (1932) pp. 161-4.

Pure hydrocarbons in the amount of 30 per cent by volume were mixed with a standard Grosny benzine and the solutions tested for anti-knock value using a variable compression engine. It was found that admixture of normal paraffin hydrocarbons increased the anti-knock value to a greater extent the longer the chain. Branched chain paraffins increased the anti-knock value and to a greater extent the more branched the chain. Olefins have more anti-knock value than the corresponding paraffins, but their value decreases with storage. Addition of the side-chains to cyclic compounds increases anti-knock value, the methyl group more than the ethyl group. Differences between position isomers of cyclic compounds could not be established.

The Transformation of Acyclic Hydrocarbons into Ethylenic Hydrocarbons. C. MATIGNON, KLING, and FLORENTINE. *Compt. Rend.* **194** (1932) pp. 1040-3.

The olefin hydrocarbons formed by the action of heat on the saturated hydrocarbons are sensitive to heat, so the reactions of formation should be accelerated by use of a catalyst. Ethane yielded 14.2 per cent of ethylene at 600°C. in the presence of nickel on pumice. Propane yielded 34 per cent and butane 40.5 per cent unsaturateds at 575°C. in the presence of copper on pumice.

Isolation and Determination of N-heptane and of Methylcyclohexane in a Mid-Continent Petroleum. M. M. HICKS-BRUUN and J. H. BRUUN. *Bur. of Stds. Jour. of Research* **8** (1932) pp. 525-40.

Oklahoma petroleum was fractionated into a series of 1°C. cuts, and the toluene removed by nitration from fractions boiling between 93°C. and 101°C. After refractionation heptane and methyl cyclohexane were found largely in the fractions of 98-100°C. b.p. Distillation through a 35-ft. laboratory column, followed by freezing and centrifuging, completed the purification. The physical constants are given and compared with data in the literature. The crude contained 0.9 per cent heptane and 0.3 per cent methylcyclohexane. No constant boiling mixture of these compounds exists. The eutectic of the condensed system is at —130.3°C.

Colored Hydrocarbons: A Blue Hydrocarbon. M. BADOCHE, *Compt. Rend.* **194** (1932) pp. 1086-8.

A deep blue colored cyclic hydrocarbon, $C_{24}H_{20}$, prepared. It melts at 465°C. and

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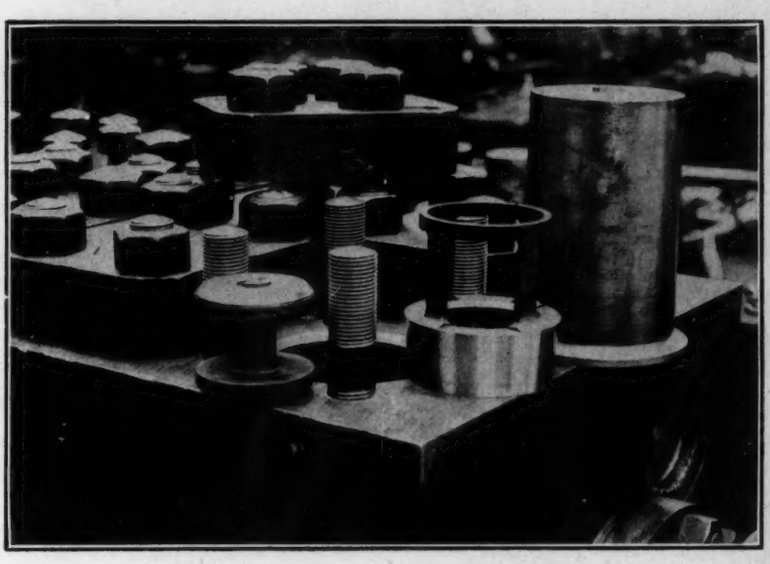

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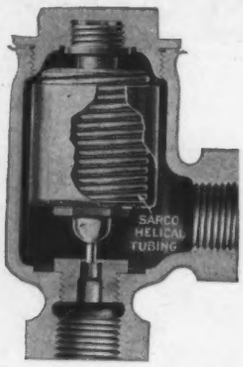

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Growth of Aspergillus Versicolor on Higher Paraffins. S. J. HOPKINS and A. C. CHIBNALL, *Biochem. J.* **26** (1932) pp. 133-42.

A strain of Aspergillus versicolor grows on odd or even numbered synthetic higher paraffins as a sole source of carbon, but not on those above $C_{34}H_{70}$. The primary oxidation product is a keytone or polyketone. More extensive oxidation results in formation of shorter fatty acids.

Manufacture: Processes And Plant

Relation Between Heat Transfer and Fluid Friction. E. V. MURPHREE, *Ind. Eng. Chem.* **24** (1932) pp. 726-36.

The basis for and derivation of equations for fluid flow and heat transfer for fluids flowing in pipes are given and a method for the direct calculation of heat transfer coefficients for fluids in turbulent flow is developed. The limitations of the method are stated. Calculated coefficients are compared with experimentally determined coefficients for gases, water, and oils. The possible application of the method of calculation to other diffussional processes, such as dehumidification and adsorption, and to other types of fluid flow, such as flow perpendicular to tubes and through tower packing, is mentioned. A bibliography of 28 references to old and recent work on this general subject is included.

Heat Transmission to Liquids Flowing in Pipes. T. K. SHERWOOD and J. M. PETRIE, *Ind. Eng. Chem.* **24** (1932) pp. 736-45.

Data are presented on the transfer of heat to water, acetone, benzene, kerosene, and n-butyl alcohol flowing in stream-line and in turbulent flow through a 4.494 inch I. D. steam-jacketed copper tube. The data on transfer in turbulent flow are well correlated by the Dittus and Boelter equation. This equation also correlates the data of Nusselt on heating air and those of Morris and Whitman on heating oils at high velocities. It is suggested as the best form of the original Nusselt equation for correlation data on heat transmission to various fluids in turbulent motion within clean horizontal tubes. However, if gives high values for "h" for petroleum oils at one to three times the critical velocity, in which range the value of the exponent of the Reynolds criterion is greater than 0.8.

Vapor-Phase Cracking of Gasoline. H. A. CASSAR, *Ind. Eng. Chem.* **24** (1932) pp. 802-4.

The distillate cracked was cut from Pennsylvania crude with 34 per cent at 212°F. and end-point of 410°F. Feed rate and temperature were varied in a series of experiments. The data are presented in graphical form. The main subject studied was the production of olefin gases suitable for use as chemical raw material. The results indicate that the gas formed per unit time is proportional to the quantity of gas already formed, or the reactions are auto-catalytic. Hence, a partially cracked or recycle stock is preferable to a straight-run stock for producing gas. A general empirical equation is suggested for gas evolved as a function of temperature and rate at atmospheric pressure. Between 500°C. and 700°C. the reaction rate doubles for every 70°C. rise in temperature. This agrees

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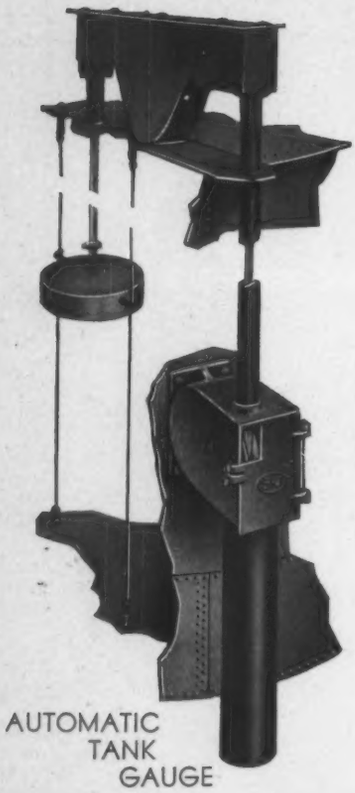

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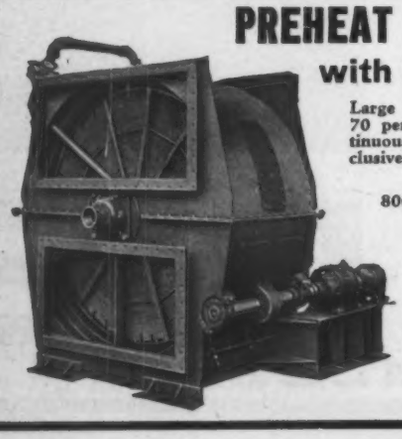

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fairly well with the general knowledge that gas reactions double in velocity every 10°C. at 0°C. and every 100°C. at 1000°C.

Brucite Sweetening for Oklahoma Distillates. F. T. GARDNER, *Chem. & Met. Eng.* **39** (1932) pp. 378-9.

The sweetening is accomplished through the use of the mineral brucite or by magnesium hydroxide prepared by calcining magnesite and hydrating the MgO to $Mg(OH)_2$. The hydroxide reacts with mercaptans to form the basic alkyl sulfide which in turn reacts with sulfur to form magnesium sulfide, magnesium hydroxide, and the dialkyl disulfide. Dry granular magnesium hydroxide is used in treating cylinders. The reagent bed is regenerated in situ by boiling with water and with dilute caustic soda followed by water washing and drying. Two 8-ton towers have given a throughput of 12,000 bbls. at a minimum rate of 175 bbls. per hour when treating a gasoline requiring 2 to 3 lbs. of sulfur per 1000 bbls.

Phosphorous Pentoxide as a Refining Agent for Gasoline. B. MALISHER. *Petroleum Zeitsch.* **28** (1932) No. 17, pp. 7-10.

The use of phospherous pentoxide, in amounts of 0.5 to 2.0 per cent by weight, for treating gasoline is described. Phosphorous pentoxide is added to molten asphalt with stirring and the mixture cooled and the powd. oxide and asphalt made into briquettes. The asphalt promotes the action of the oxide. For batch treatments the needed quantity of oxide and promoter is added to the cracked distillate in a still. The temp. required is 150-200°C. For vapor phase treatment the vapors are passed into a rotating cylinder containing oxide and promoter suspended in heavy oil at a temp. of 200-250°C. The refining action requires a few minutes. P_2O_5 separates as a liquid and the treated gasoline is colorless. A stirrer is required in the cylinder if large quantities of gasoline are to be treated. Treating loss is small, no sludge is formed, and no neutralization is required. The gasoline contains a small quantity of H_2S that is removed with water or dilute alkali. The heavy product containing the P_2O_5 is washed with water, removed as phosphoric acid, and used in the manufacture of phosphates. The residual oil is colorless kerosene and yellow lubricating oil.

Bleaching Earth Ejectors. R. FLUGEL. *Petroleum Zeit.* **28** (1932) No. 17, pp. 10-12.

Ejectors for mixing oil and fullers earth are described and illustrated. Performance data are given.

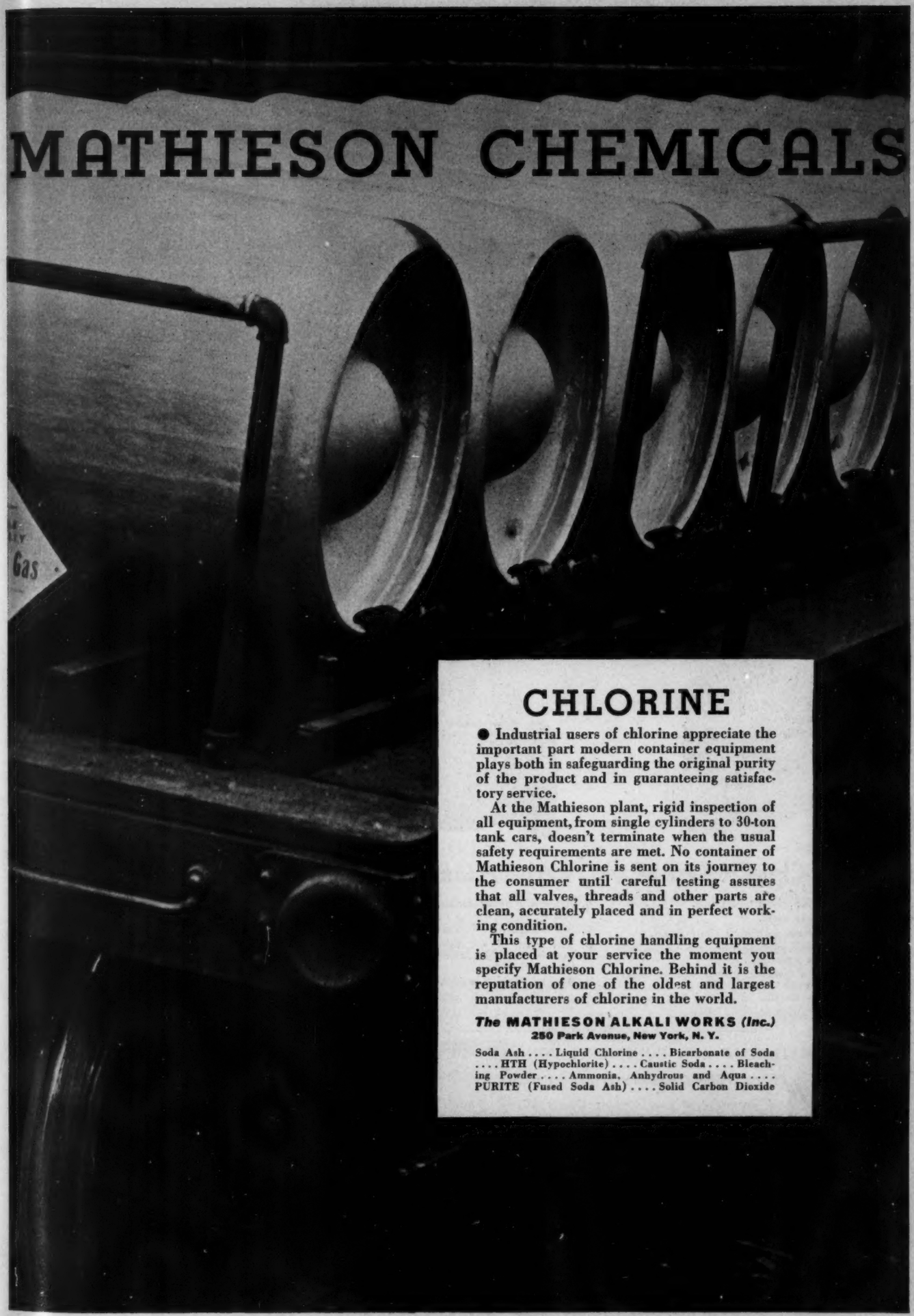
Special Alloy Steels As Applied to Chemical Engineering. T. G. ELLIOTT, R. G. SARJANT, and W. CULLEN. *Chem. and Ind.* **51** (1932) pp. 502-14 and pp. 527.

The steels considered are of corrosion- and heat-resisting types, particularly high chromium or chromium-nickel. Reference is made to recent literature on this general subject. The constitution of the alloys, corrosion tests, intergranular corrosion, weld decay, creep tests, working properties, and applications in the processing industries use in furnaces, are among the subjects discussed.

Products: Properties and Utilization

The Gum Stability of Gasolines. E. W. ALDRICH and N. P. ROBIE. *Jour. S.A.E.* **30** (1932) pp. 198-207 T.

Gum formation does not start until the oxygen pressure begins to fall in the accelerated oxidation test of gasoline. The length of this induction period (I) is inversely proportional to the oxygen pressure and varies with the temperature



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according to the equation log. I = A + B/T, (T = absolute temp.) after I has been corrected by a factor for the time used in heating the bomb. The constants A and B vary with the gasoline. Consequently, determinations are required at two or more temperatures for each gasoline in order to predict storage stability. Resin deposition by gasoline is discussed.

The Strobophonometer. R. STANSFIELD and R. E. H. CARPENTER. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 513-25.

The need for knock tests at higher test-engine speeds suggests the desirability of an electrical method for distinguishing between sounds originating with the engine mechanism and with the combusion process. The "Strobophonometer" of the authors is an instrument for the analysis and measurement of sounds or vibrations emanating from any source in cycles. It applies to the sounds from the engine a principle analogous to that of the stroboscope, that is, it selects, on a time basis, some part of a recurrent noise to be investigated. The intensity of the noise is indicated on a meter. The length of the listening period and the position of this period in the cycle of operations can be adjusted. The device can be advantageously applied to any cyclical system that originates noise, such as a pair of gears. The apparatus has many advantages over the bouncing-pin for engine work. Typical results are presented and discussed.

Influence of Types of Hydrocarbons on Illuminating Power of Oils. N. DANAILA and V. Z. STOENESCU. *Petroleum Zeitsch.* **28** (1932) No. 17, pp. 1-4.

In order to make a series of synthetic burning oils, known amounts of olefines and aromatics were added to Arbanasi extract. The effect of these additions and of refining with sulfuric acid, sulfur dioxide, and fullers earth was studied by determining the illuminating power in Hefner units after burning the lamp 1, 2, 3, 4 and 5 hours. Aromatic hydrocarbons do not decrease the illuminating power but help it up to a maximum proportion of aromatics (30 to 35%) beyond which the illuminating power decreases. The harmful compounds are asphaltic substances. These must be removed in the refining treatment but the aromatics must not be removed. Sulfuric acid treatment improves illuminating power through removal of asphalt. Treatment with fullers earth has little effect. The occasional inferority of Rumanian burning oils results from presence of asphaltic components or to use in poor lamps and not from the presence of aromatics.

Free-Wheeling Lubricants. S. A. W. LUBRICANTS DIVISION. *Jour. S. A. E.* **30** (1932) p. 49.

The original classification of these lubricants has been modified. The properties are to be stated in the order: (1) Temperature above which it should be used, (2) Minimum and maximum S.U. viscosity at 210°F., (3) Maximum S.U. viscosity at 100°F. or 130°F., (4) Temperature at which the lubricant shall not channel in service.

Grade No.	(1)	(2)	(3)	(4)
80	—15°F	42/54	168/311 at 100°F	—10°F
90	+15°F	74/100	345/495 at 130°F	0°F
110	+40°F	140/230	1030/1590 at 130°F	+10°F

The oils should be well refined, their viscosity should not be built artificially, and all fillers should be absent.

Cutting Fluids and Their Applications. J. D. ROBEY and I. L. SUMNER. *Am. Machinist* **76** (1932) pp. 50-3.

Compositions of various cutting fluids are given in detail and the applications of the compounds are tabulated.

Effect of Catalytic Actions on the Aging of Lubricants. J. DAMIAN. *Chimie et Industrie,* Special No., March, 1932, pp. 323-5.

In the aging test, as described by Dixmier, the changes resulting from 120 hrs. heating of the oil at 140°C vary depending on whether the sample is placed in a copper, steel, or glass container. The greatest aging is produced by copper, followed by steel and glass. If oil is to be used for airplane motors, the copper container should be used.

Determination of the Melting Points of Special Waxes. C. S. GLICKMAN. *Anal. Ed., Ind. Eng. Chem.* **4** (1932) p. 304.

The standard methods gave trouble in that some waxes became transparent and gelatinous at a temperature 18°-35°C below their melting points. A method called the float method is proposed and data are given comparing results secured by its use with those obtained by the drop method and the capillary tube method.

Velox Explosion Boilers. ANON. *Mar. Eng.* **55** (1932) pp. 125-7.

An interesting new boiler that may have a profound influence on ship propulsion is the result of work on exhaust-gas turbines used for driving superchargers and as prime movers. In the constant pressure type the combustion space is charged by a compressor driven by a flue-gas turbine, the fuel being oil or pulv. coal. In the explosion type the combustion chamber is charged 40 to 60 times per minute, by the turbine driven compressor, with an explosion mixture of fuel oil or gas and air. The charge is ignited with all valves closed. When combustion is complete the

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valves open and the hot gases pass through water-jacketed tubes to raise steam and then pass on to drive the gas turbine. Superheaters are placed in the combustion space. Overall efficiency is high and space requirement is small in comparison with a conventional layout of boiler equipment.

Apparatus for Reactions in Liquid Phase at Elevated Temperatures and Pressures. H. ADKINS. *Anal. Ed., Ind. Eng. Chem.* **4** (1932) pp. 342-5.

An apparatus and technique for studying reactions of organic compounds with gases at temperatures up to 400°C and pressures of several hundred atmospheres is described. It is suitable for catalytic hydrogenation. Two such apparatus are now on the market.

Standardization of Methods of Test for Lubricating Oils. ANON. *Erdol und Teer* **8** (1932) pp. 203-5.

The Lubrication Committee of the German Society for Testing Materials has collected and published the results of two years' work on standardization. Terms are defined and test modifications summarized for sp. gr., drop-point, viscosity, ash content, water content, neutralization and saponification values, hard asphalt, and flash point.

Apparatus for Pressure Control in Vacuum Distillations. L. M. ELLIS. *Anal. Ed., Ind. Eng. Chem.* **4** (1932) pp. 318-9.

An apparatus is described that includes an adjustable mercury contact point relay circuit to stop and start the vacuum pump. Reservoirs and a capillary leak are used to dampen pressure fluctuations. The deviations in pressure are too small to be detected by an ordinary manometer.

Approximate Determination of Olefin and Aromatic Hydrocarbons. J. C. MORRELL and I. M. LEVINE. *Anal. Ed., Ind. Eng. Chem.* **4** (1932) pp. 321-2.

An empirical method based on determination of the total aromatic and olefin content and estimation of the olefin content from the weight of the residue obtained upon distillation of the oil after treatment with 91% sulfuric acid. Data are presented showing results secured by application of the procedure.

Determination of Olefines by Bromine Titration. J. C. MORRELL and I. M. LEVINE. *Anal. Ed., Ind. Eng. Chem.* **4** (1932) pp. 319-21.

The procedure described is a rapid method for the determination of olefins in cracked distillates. Errors involved in bromine titration, such as substitution, are claimed to be obviated by use of a factor determined through analysis of standard solutions of olefins. Data are given showing the application of the method to several types of solutions.

Natural Gas, Natural Gasoline, and Gas Recovery

The Heat Treatment of Hydrocarbons with Special Reference to the Gaseous Hydrocarbons. II. A. E. DUNSTAN, E. N. HAGUE, and R. V. WHEELER. *J. Soc. Chem. Ind.* **51** (1932) pp. 131-3 T.

Gaseous paraffins can be converted into liquid fuels by thermal treatment at elevated temperature and atmospheric pressure. The yield is low and carbon is deposited. Gaseous olefins can be polymerized at 350-600°C. and under pressures up to 2000 lbs. The yields are high, products have high anti-knock value, and the operation can easily be effected on a large scale.

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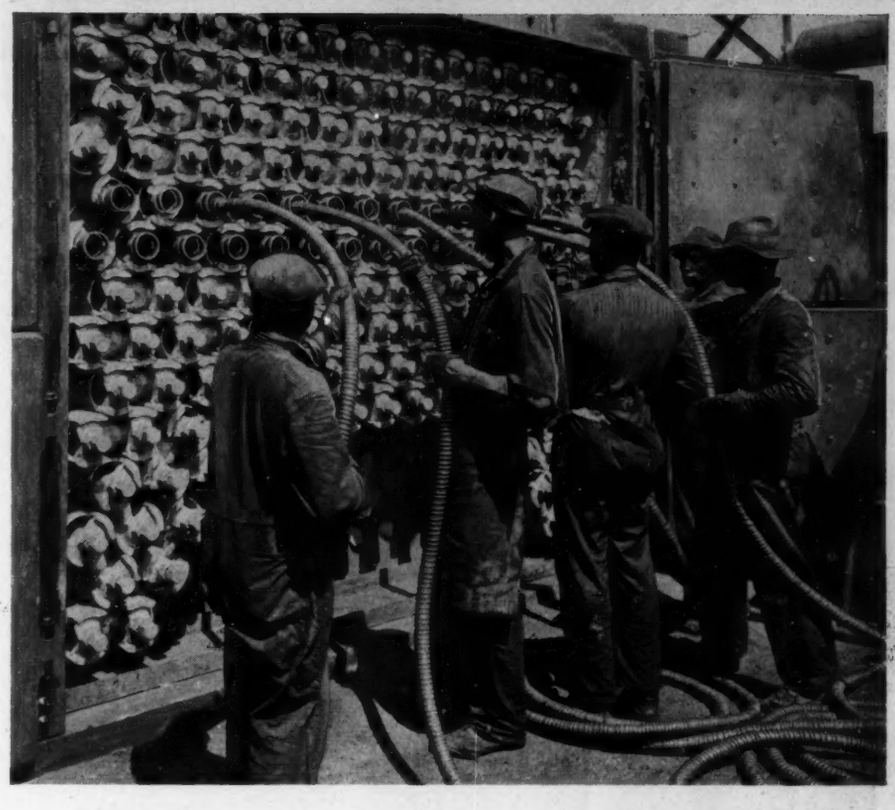

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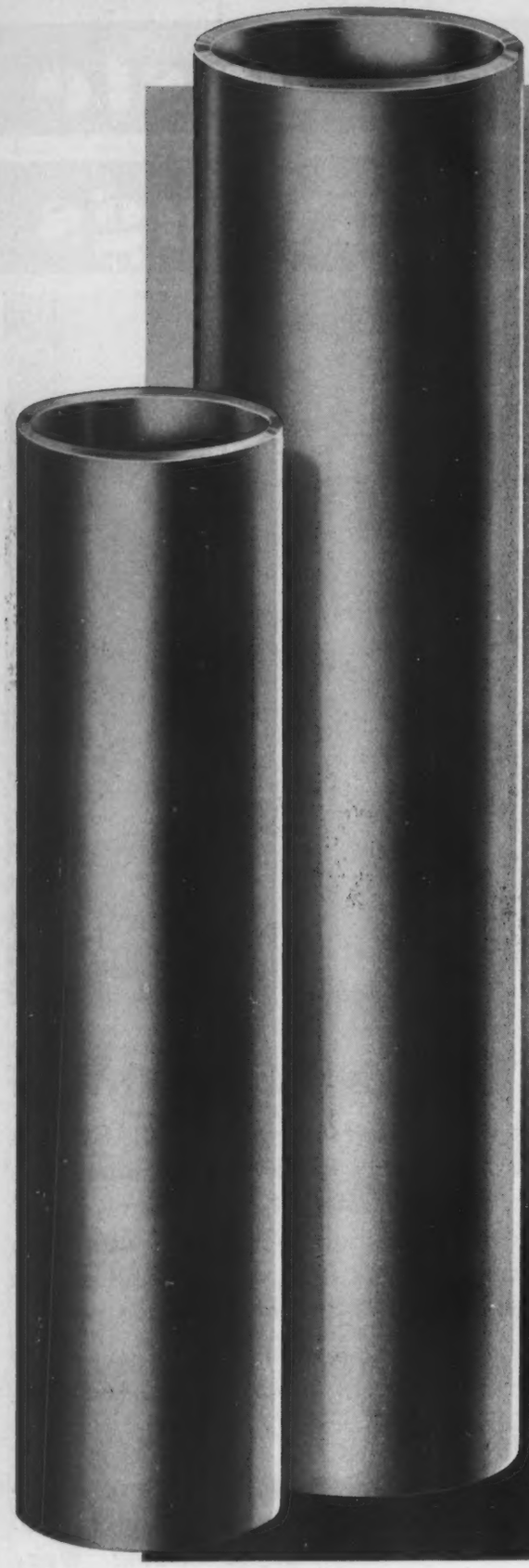

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This superior tubular material offers these outstanding advantages:

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- Exceptional ductility.
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The high quality and general adaptability of these exceptional tubes make them particularly attractive from the standpoint of both economy and durability. They are especially recommended for cracking tubes and for piping in heat exchangers, ducts, containers, tanks, agitators and other refining equipment where hot oil is handled.

NATIONAL Engineers and Metallurgists will gladly lend their aid in determining the best application of stainless and heat resisting pipe and tubes to your particular requirements.

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THE MONTH IN REVIEW

National Petroleum Association Convention

NATIONAL Petroleum Association will hold its thirtieth annual meeting at the Hotel Traymore, Atlantic City, New Jersey, September 14, 15, 16. According to announcements the program and informal conferences will deal with subjects of immediate and timely interest to the oil industry. Among these are the economic conditions confronting American business and corrective measures that are under way; taxation—the problems arising out of the new federal taxes on gasoline and lubricating oils and the battle against tax evasion; a discussion of fuel performance in the internal combustion engine; the economics of pipe line transportation in the oil industry; progress in aviation; the anti-trust laws; and the controversy over regulation of the use of highways. The association invites representatives of all branches of the industry to attend, as well as the executives of every member company.

The program follows:

WEDNESDAY AFTERNOON

Address of welcome, E. M. Lyons, president, National Petroleum Association.

Appointment of Committees.

"Fuel Performance in the Internal Combustion Engine," Thomas Midgley, vice president, Ethyl Gasoline Corporation.

"How Can Industry Return to Normal?"—an illustrated talk, Rowland Rogers.

"The Battle Against Gasoline Tax Evasion," Paul E. Hadlick, American Petroleum Institute.

"The Controversy Over Highway Regulation; the Purposes of the Newly Organized Highway Users Conference," Pyke Johnson, National Automobile Chamber of Commerce.

THURSDAY MORNING

"Economics of Pipe Line Transportation in the Oil Industry," Joseph E. Pogue, consulting engineer.

"Progress in Aviation," Col. Clarence M. Young, Assistant Secretary of Commerce.

"Out of the Valley of Depression," Albert W. Atwood, financial and editorial writer, Saturday Evening Post.

THURSDAY AFTERNOON

Group conferences.

Golf at the Seaview Golf Club, S. P. Worthington in charge.

THURSDAY EVENING

7 O'clock

Fellowship banquet, Seaview Golf Club. Ladies invited.

FRIDAY MORNING

"Problems Arising Out of the New Federal Taxes on Gasoline and Lubricating Oils," Willis Crane, associate counsel, National Petroleum Institute.

"The Problem of Stabilization," E. W. Mayo.

"Public Interest and the Anti-Trust Laws," Gilbert H. Montague.

Refining Division, A. P. I. Nominating Committee

D. J. MORAN, vice president and chairman of the Division of Refining, American Petroleum Institute, has appointed a committee of 15, representing all of the refining areas of this country, serving as the nominating committee of the division at Houston, November 15, 17. This group will nominate 20 members of general committee governing the division of refining.

Dr. T. G. Delbridge, supervisor of the process division of Atlantic Refining Company, is chairman of the nominating committee appointed by Chairman Moran for the 1932 meeting, and members of the committee serving under Dr. Delbridge are: H. W. Camp, Empire Oil & Refining Company, Tulsa; E. M. Craig, Freedom Oil Works, Company, Freedom, Pa.; J. L. Finley, Humble Oil & Refining Company, Houston; G. W. Gray, The Texas Company of Delaware, New York; R. W. Hanna, Standard Oil Company of California, San Francisco; R. E. Haylett, Union Oil Company of California, Los Angeles; C. L. Henderson, Vickers Petroleum Company of Delaware, Wichita, Kans.; Emby Kaye, Skelly Oil Company, Tulsa; E. R. Lederer, Texas Pacific Coal & Oil Company, Fort Worth; R. C. Osterstron, Pure Oil Company, Chicago; A. E. Pew, Jr., Sun Oil Company, Philadelphia; E. E. Plumily, Magnolia Petroleum Company, Beaumont, Texas; G. H. Taber, Sinclair Refining Company, New York; and F. W. L. Tydeman, Shell Petroleum Corporation, St. Louis.

Asphalt Demand Lower in 1931

PRODUCTION of petroleum asphalt at the refineries of the United States dropped to 2,975,690 short tons in 1931, from 3,223,888 short tons produced in 1930. This is exclusive of road oil. The decrease totaled 248,198 short tons and is attributed to decreased demand for the product, and increased importation of lake asphalt and grahamite, according to annual figures compiled by the Bureau of Mines, Mineral Markets Reports No. M.M.S. 135. During the year 16,732 tons were added to stocks at refineries, bringing total stocks to 304,623 tons.

Of the 2,975,690 short tons of asphalt manufactured at petroleum refineries in 1931, 1,700,946 tons was made from foreign crude oil (chiefly Venezuela, Colombia and Mexico) and 1,274,744 tons from domestic crude oil.

Sales of petroleum asphalt by refineries were 10.7 per cent less in quantity and 28.2 per cent lower in value in 1931 than in 1930. From 3,216,440 short tons, valued at $34,622,032, in 1930, they decreased to 2,873,291 tons, valued at $24,861,339 in 1931. The decline is attributed to decreased construction of first class highways and decline in production of prepared roofing materials.

Mississippi Crude Heavy, Asphalt Base

Henslee and associates' Warner 1, NW NE SE Section 14-5-1e, Rankin County, which has flowed much heavy oil and later oil with much salt water, from total depth of 2470 feet, has been tubed with 1200 feet of two-inch tubing and 300 pounds of gas used as a lifting force. When allowed to flow it showed 500 barrels of oil daily and 3000 barrels of warm salt water. It is on the southeast flank of the Jackson field.

The following tests were made of the crude from this well:

Gravity, 13.6; flash point, 285 degrees F.; viscosity, Furol at 122 degrees F., 202; pour test, 0 degrees F. Per cent water and sediment, 10.0 (8 per cent water); sulphur content, 1.82 per cent.

Yields

Gas oil, 30.0 per cent; lube distillate, 25.0 per cent; asphalt, 43.0 per cent; loss, 2.0 per cent.

Gas Oil

Gravity, 23.5; flash, 275 degrees F.; viscosity SU at 100 degrees F.; 66; pour test, 0 degrees F.; lube distillate; gravity, 18.0; flash 425 degrees F.; vis. SU at 100 degrees F., 1060; vis. SU at 210 degrees F., 71; pour test, 0 degrees F.

Asphalt

Specific gravity at 77 degrees F., 1.018; penetration at 77 degrees F., 105; ductility at 77 degrees F., 110 plus; flash point,

650 degrees F.; soluble in GS2, 99.8 per cent.

The following comparison is made of this crude with that of Smackover:

Mississippi—Gasoline, ——; gas oil, 30.0 per cent; lube dist., 25.0 per cent; asphalt, 43.0 per cent; loss, 2.0 per cent.

Smackover—Gasoline, 10 per cent; gas oil, 35 per cent; lube dist., 27 per cent; asphalt, 25 per cent; loss, 3 per cent.

A. S. T. M. Committee D-2 Active

AMERICAN Society for Testing Materials Committee D-2 on Petroleum Products and Lubricants has several important projects before its various subgroups. The working groups in Committee D-2 are sub-committees and technical committees, the former concerned with the development of methods of test and the latter with the relation between test data and service performance of materials and with the preparation of materials specifications. The outstanding features of the sub-committee program are as follows:

Sub-committee IV on Grease is giving further study to the Tentative Method of Test for Penetration of Greases and Petrolatum (D 217-27 T) particularly with respect to its use on hard greases.

Sub-committee V on Viscosity is cooperating with representatives of Committee D-9 on Electrical Insulating Materials on the determination of the viscosity of electrical insulating oils at temperatures around 0°C.

Sub-committee VIII on Distillation is developing a method for distillation of petroleum oils under vacuum.

Sub-committee X on Sligh Oxidation Test is a new sub-committee organized to perfect the Sligh oxidation test so that reproducible results may be obtained.

Sub-committee XII on Flash Point is studying the determination of the flash point of cut-back asphalts and similar materials.

Sub-committee XXI on Crude Petroleum is developing a method for evaluating crude petroleum.

Sub-committee XXVII on Classification of Transmission Lubricants and Automotive Greases has been requested to prepare a classification of automotive greases based upon consistency and the viscosity of the mineral oil content.

The principal activities of the technical committees may be outlined as follows:

Technical Committee A on Gasoline is investigating the relation between the gum content of gasoline by various methods and the behavior of the gasoline in service; also the gum stability of gasoline. An attempt is being made to correlate vapor pressure data by the Tentative Method of Test for Vapor Pressure of Natural Gasoline (Reid Method) (D 323-31 T) with vapor-locking characteristics of motor fuels.

Technical Committee B is sponsoring a symposium on motor lubricants for the regional meeting of the society to be held in New York City in March, 1933.

Technical Committee C on Fuel Oils (including Diesel fuel) is co-operating with the Technical Committee on Lubricants and Liquid Fuels of the Federal Specifications Board on a revision of the federal specifications for fuel oils. It is also working on specifications for Diesel fuels.

Technical Committee D on Stoddard Solvent is working on a revision of the commercial standard specification for this product.

The following officers were re-elected for the ensuing term of two years at the recent meeting of this committee: Chairman, T. A. Boyd, Fuel Section, Research Laboratories, General Motors Corporation (newly elected); vice chairman, T. G. Delbridge, Process Supervisor, The Atlantic Refining Company; secretary, R. P. Anderson, Secretary, Division of Refining, American Petroleum Institute.

Abstracts of Paper Presented Before The Division of Petroleum Chemistry, American Chemical Society, Denver, Colorado, August 22 to 26, 1932

Vapor Phase Cracking. H. P. A. GROLL.

The cracking of gaseous and liquid hydrocarbons was studied over a large range of temperatures and throughputs. Regularities are found in all products although propylene gas produced highest yields of aromatics. "Demethanization" prevails over dehydrogenation at all temperatures, carbonization being prevented. A mechanism is offered for formation of aromatic hydrocarbons at high cracking temperatures. A method is described for calculating products and yields of vapor phase cracking as functions of temperature and rate of throughput. It is probable that the throughput of cracking processes can be increased considerably through these data.

Thermal Decomposition of Isobutane Into Primary Products. MAX NEUHAUS AND L. F. MAREK, Massachusetts Institute of Technology.

The pyrolysis of isobutane at 600° and 650°C. was investigated for the purpose of determining the primary products of the thermal dissociation. Decomposition was varied over a wide range and the results plotted in such a way that the curves could be extrapolated to zero per cent cracked in order to indicate primary product distribution. Listed in the order of their relative importance, the primary dissoeiation products were found to be: (1) hydrogen and isobutylene; (2) methane and propylene; (3) ethane. Velocity constants for the thermal dissociation rates at 600° and 650°C. have been calculated. By use of overall dissociation rate constants and primary dissociation distribution, rate constants for the individual primary dissociation reactions of ethane, propane, n-butane, and isobutane over the temperature range of 550° to 650°C. have been calculated.

The Computation of Distillation Apparatus for Hydrocarbon Mixtures. E. W. THIELE AND R. L. GEDDES, Standard Oil Company (Indiana.)

A method of computation is presented for the solution of column problems involving complex mixtures obeying Raoult's law or some simple modification of it. A constant plate efficiency for all components is assumed. The number of components may be either finite or infinite. The method is extended to cases in which side streams are drawn from the column, or the feed is admitted at more than one point.

Significance of the A. S. T. M. Distillation Curve. M. G. BLAIR AND R. C. ALDEN.

Previous contributions relating the A. S. T. M. distillation curves of motor fuels to automobile performance are briefly reviewed. Mention is made of the use of A. S. T. M. distillation curves in estimating composition, gravity, and vapor pressure of natural gasoline. Summary charts are presented in the foregoing fields. Graphs are also presented, and briefly described, by means of which the A. S. T. M. distillation curve of motor fuels can be used to estimate the composition, vapor pressure, and the minimum temperature at which incipient vapor lock might be expected. A bibliography of work on the subject is included.

The Effect of Tetraethyl Lead on Octane Number. L. E. HEBEL, T. B. RENDEL, AND F. L. GARTON.

An empirical analysis has been made of the relationship between the concentration of tetraethyl lead and the octane number of a gasoline, and a definition is developed for the "lead susceptibility" of any gasoline. It is shown that the octane number of an

New low-priced cars this year need high anti-knock gasoline

And low-priced cars burn most of the gasoline—there are more of them

Small car owners are canny buyers—no fancy prices for them

What a chance for the Dubbs refiner He can make and sell anti-knock gasoline at low cost or he can charge a premium The quality justifies it

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

ethylized gasoline is determined by a combination of five distinct factors, whose proper relationships are incorporated in an "ethyl blending chart." This chart may be used for determining the lead susceptibility of a gasoline from the octane numbers of two blends containing different concentrations of tetraethyl lead. Lead susceptibilities of gasolines made from various crudes and by several processes are given.

Isolation of the Three Xylenes from an Oklahoma Petroleum. J. D. WHITE AND F. W. ROSE, JR.

Each of the three xylenes has been isolated in a high state of purity from an Oklahoma petroleum. The relative amounts present are o—, 3; m—, 3; p—, 1, the total xylene content of the crude oil being about 0.3 per cent. The density, refractive index, boiling point, freezing point, and infra-red absorption spectrum have been determined for each xylene. The isolation of the xylenes was accomplished by combining the distillation, extraction with liquid sulfur dioxide, and crystallization.

Selenium As a Catalyst in the Kjeldahl Determination of Nitrogen in Oils. R. A. BAXTER, R. E. HOWE, AND T. H. SCHULTZ, Colorado School of Mines.

In the Kjeldahl determination of nitrogen in oils, the usual catalyst is copper sulfate. The minimum time for the digestion using this compound is usually about three hours. With mercuric oxide and also tellurium the minimum time is about two and one-half hours. Using selenium as a catalyst the time can be cut down to as low as fifteen to twenty minutes. The great saving in time is obvious, and proves that selenium is of utmost value in this determination. About one-sixth of the time is required, which is of great importance where many of these determinations are being run.

Gum Formation in Gasoline. I. The Measurement of the Gum Stability of Gasoline. T. H. ROGERS, J. L. BUSSIES, AND P. T. WARD.

One of the important current problems of gasoline refining is that of development of a test for predicting storage behavior of cracked gasoline. The Voorhees stability test possesses certain advantages over the metal bomb test, and has been used to evaluate the stability of a number of gasolines. Extensive storage tests show that a quantitative correlation between induction period and storage is obtained, the relationship varying somewhat with the history of the gasoline. Storage tests in large tanks also correlate with the induction period, although the rate of gum formation is slower because of inadequate air.

Gum Formation in Gasoline. II. Control of Gum Formation in Gasoline by the Use of Antioxidants. T. H. ROGERS AND VANDERVEER VOORHEES.

The effectiveness of antioxidants in preventing gum formation of cracked gasoline is a function of the reducing power of the compound. The aminophenols constitute the most effective class of compounds. The disadvantages of low oil solubility and high water solubility, which is typical of most of the efficient antioxidants, is avoided in the case of p-benzylaminophenol, which is a most satisfactory inhibitor in every way. It is shown by storage tests that this compound is color stable, is not affected by the presence of water, and possesses exceptional gum stabilizing ability.

Inhibitors in Cracked Gasoline. II. Correlation of Inhibiting Action and Oxidation Reduction Potential. C. D. LOWRY, JR., GUSTAV EGGLOFF, J. C. MORRELL, AND C. G. DRYER, Universal Oil Products Company.

A correlation has been established between the effectiveness of gasoline inhibitors as measured by an accelerated oxidation test and their critical oxidation potentials. The best inhibitors tested had potentials between .600 and .800 volts; fair inhibitors were in the range .800 to 1.043 volts. Compounds with potentials above the latter figure had practically no inhibiting action under the conditions of test. Hydroquinone and certain ethers showed less inhibiting action in the bomb test than their potentials would lead one to expect; this is attributed to their tendency to undergo direct oxidation. The correlation is valid, not alone for gasoline, but also for use of inhibitors in aerolein and fatty oils.

Products of Commercial-Scale Gas Cracking. WALTER J. PODBIELNIAK.

In the course of experiments with a semi-commercial plant for cracking natural gas fractions, complete analyses were made of all products by means of special equipment. Tables and curves are offered showing these products and their proportions at various cracking temperatures and throughput speeds. Emphasis is laid on high temperature and short heating period, preventing secondary reactions. Effect of aromatics produced, in gasoline blends, as well as possible use for other products is shown. Cost calculation procedure is indicated, with charts, on basis of fuel gas used for cracking. Photographs and description of cracking apparatus are included.

Apparatus and Methods for Precise Fractional Distillation Analysis. II. Automatic Recorder and Control for Low-Temperature Fractionation Analysis. WALTER J. PODBIELNIAK.

An automatic recording and control mechanism developed by the author, for use with the low-temperature fractionating apparatus previously offered by him, is described in detail. By means of this mechanism, in addition to the plotting of the fractional distillation curve directly, a curve is included for the instantaneous rate of distillation. The apparatus, used with precision or standard precision-type fractionating columns, makes procedure 85 per cent automatic, with greater dependability and accuracy and diminished cost of operation. A standardization chart is suggested to complete the standardization of the low-temperature fractionation method of analysis for gases and volatile liquids.

Apparatus and Methods for Precise Fractional Distillation Analysis. III. New Developments in Laboratory Fractionating Columns. WALTER J. PODBIELNIAK.

This report covers an investigation for the development of vacuum jacket type laboratory fractionating columns of highest possible effectiveness for use in analytical distillations of compounds with boiling points ranging from —180°C. to 500°C. An extensive search of the literature disclosing no favorable leads, many new departures in design were tested, complete data being recorded on column efficiency as related to adiabatic perfection. As a result, in addition to the valuable data, a new type column is now being manufactured of pyrex and quartz components which lends itself with greater adaptability to a specific range of distillation.

Apparatus and Methods for Precise Fractional Distillation Analysis. IV. Distillation at Higher Temperatures. WALTER J. PODBIELNIAK.

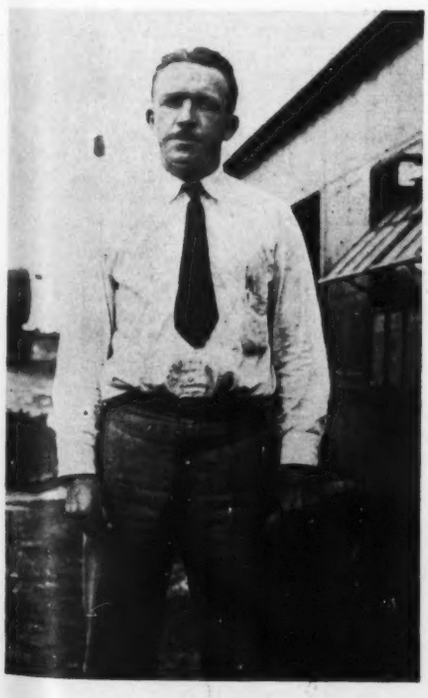
A highly specialized fractionating assembly has been developed for the analysis by precise fractional distillation of compounds boiling within the range —180° to 500°C., although not adapted for the distillation of normally gaseous or highly volatile liquids. A complete description is given of its construction and functioning, including numerous typical fractional distillations of representative commercial complex mixtures, including petroleum crude, motor fuel, absorption oil, lacquer thinner, etc. The apparatus is suggested for use as a general tool for the analysis of complex liquids of all kinds by precise fractional distillation.

PERSONALS

Hartung Has Turn For Conservation

C. H. HARTUNG became associated with Houston Oil Company of Texas soon after graduating from the Texas Agricultural & Mechanical College with the degree of B. Sc. in Chemical Engineering. After being made manager of the refining department of the Herbert Refinery at Camden, Arkansas, he has instituted several things that have a tendency to save material and products. Usually at the loading racks in the average plant, the small amount of gasoline or kerosene or naphtha left in a tank car after it has been received back to the plant for loading again is drained from the outlet valve on the ground. This not only wastes the material, but provides a fire hazard by having the ground and ties saturated with inflammable material. By connecting tube with flexible hose, leading to a common drain line, the gasoline or other material is salvaged. After the car is loaded, the material is pumped over to the slop tank for rerunning.

When the season is right, and the work in the plant has been caught up, the hills and swamps draw his attention. The owner of several high powered bird dogs, he and the fellow hunters are able to draw the bag limit on quail any time.



C. H. HARTUNG

M. G. COLBY

Colby Researches In Lubrication

WHEN M. G. Colby left Oklahoma University, where he received the degree of Master of Arts, Organic Chemistry specializing in petroleum and its products, he accepted a position with the Pierce Petroleum Corporation as routine and analytical chemist in the refinery at Sand Springs. Remaining there for 14 months, he was transferred in August, 1925, to St. Louis and placed in the grease manufacturing division and given charge of the laboratory there. In October, 1926, he was transferred back to Sand Springs to the position as plant chemist and assistant chief.

After Sinclair Refining Company took over Pierce Petroleum Corporation, Mr. Colby remained as plant chemist in charge of the laboratory and control of the plant. He is a member of the American Chemical Society and has done a lot of research in lubricating oils.

He spends a lot of his spare time out at Mohawk lake angling for bass. His tales concerning his piscatorial complex do not come up to a lot most people tell, so when he says that a bass weighs about a pound and a half or so, its about that big. Like a lot of other chemists though, procrastination cost him the Process number of THE REFINER, but, you can bet that his subscription will not go delinquent again soon.

Hyler Was Born to Refining

A PRODUCT of Marietta College, D. H. Hyler began his refinery experiences while yet in his teens. He comes of a refining family, his father being one of the pioneer refiners in the eastern part of the United States. Hyler recalled that while he was a small lad, the refinery where he was reared ran the gasoline distilled from the crude into the river, while the kerosene was barreled and barged down the river for sale at ports along the way.

In 1913, he began working for Standard Asphalt & Refining Company at Independence, Kansas, remaining with that company until March 16, 1920, when he became associated with Empire Oil & Refining Company. In a pause prior to this time, he served overseas in the tank corps, emerging with a commission as lieutenant. In a period between March 1, 1922, and January 1, 1924, he was with Lion Oil Refining Company, El Dorado, Arkansas. When the Continental Oil Company purchased the Texhoma Refinery at Wichita Falls he was transferred to that plant as superintendent.

His hobbies are golf in particular, and in a minor sense that of piloting chemistry classes through the plant when some school makes a visit.

D. H. HYLER

PLANT ACTIVITIES

Completed: Pure Oil Company has completed construction of its Midland, Michigan, refinery (Alco Products, Inc., contractors) and is operating, with C. M. Ridgway, formerly superintendent Old Dutch Refining Company, Muskegon, in charge of operations.

Operating: Cedar Grove Refining Company, Cedar Grove, (Shreveport, Louisiana, suburb) has completed installing equipment on site of D'Artois refinery and started operating. Gene Griswold, owner. A. F. Kelly, superintendent.

Boiler House: Wolverine Empire Refining Company, Reno, Pa., is enlarging present steam generating equipment, adding boilers, stoking equipment and complete automatic fuel conveyer system.

Cracking Unit: Distillazione Italiano Combustibili S.A., Venice, Italy, has completed construction of its new 2000-barrel full flashing Dubbs cracking unit, making the second Dubbs plant for this company.

Cracking Unit: Diadema Argentina Sociedad Anonima de Petroleo, Buenos Aires, Argentina, is erecting two large Dubbs cracking units increasing its battery to six units of this type.

Cracking Unit: Shell Oil Company of Canada has let contract for Dubbs combination topping and cracking system, 3700 barrels capacity, also for tankage, pumps and other equipment. Furnace and boiler house to Foster Wheeler Company, Ltd., boilers to Canadian Vickers Company. Plant will include stabilization and gasoline recovery system and treating equipment.

Vacuum Unit: Kendall Oil Company, Bradford, Pa., let contract to Alco Products, Inc., for erection of complete vacuum distillation plant for manufacture of special grades of automobile lubricants. Unit to adjoin another unit erected by Alco about a year ago.

Refinery: Sheridan Oil & Refining Company, E. L. Newberry, president, Sheridan, Wyoming, is building a 100-barrel refinery, day labor, cost $20,000.

Construction: Humble Oil & Refining Company, reported planning to improve and enlarge its refinery at Ingleside, Texas.

Merger: Standard Oil Company (Indiana) has offered Standard Oil Company of Kansas $3,400,000 for its refinery at Neodesha, Kansas, and pipe line properties subject to ratification by stockholders of the Kansas company September 26. Plant capacity 20,000 barrels, now expanding cracking and reforming departments, and operating at rate of 6000 barrels per day. Upon ratification the Indiana company will assume management and control of refinery and pipe lines serving it.

Gasoline Plant: Excelsior Refining Company, Inc., Shreveport, began operating new gasoline extraction plant, Joiner area, East Texas field, rated capacity 6,000,000 cubic feet of gas per day. W. L. Morgan, Henderson, Texas, in charge of operation.

Skimming Plant: R. O. and Nat Anderson, Merkle, Texas, erecting 200 barrels capacity skimming plant at Trent, Texas, T.&P. R.R., south of Noodle Creek field, Jones County.

To Resume: Coastal Petroleum Corporation, Mobile, Ala., is doing additional construction work (J. P. Devine Company contract) to enable plant to produce higher anti-knock gasoline, with plans to resume operation within a few weeks.

Complete Cracking Unit: Northwest Stellerene Company, Coutts, Alberta, has completed installation of new Dubbs cracking unit, replacing Leamon process. Reported plant will process Alberta crude.

Operating: Derby Oil Company, Wichita, Kansas, has completed modernization of twin Dubbs units, the revamping consisting of additional tubes and rearrangement of the system with one unit, and the installation of bank of floor tubes in the second still, this work being done by Alcorn Combustion Company.

Vacuum Unit: Anderson Pritchard Oil Corporation at Cyril, Oklahoma, has begun constructing a new 1600-barrel vacuum flashing unit, to be operating in November. Contract to Arthur G. McKee Company through its affiliation with Petroleum Engineering, Inc., and previous reports concerning other engineering companies were in error.

Operating: Moon Refining Company is operating a 300-barrel skimming plant at Graham, Texas, running 100 barrels daily. M. R. Hemphill, superintendent.

New Company: Associated Petroleum Corporation of Oklahoma has been formed with Victor H. Smith (formerly Coastal Petroleum Company, president) as president, and John B. Foster (president Foster Oil Company and Signal Oil Company) as vice president. C. H. Rosenstein is secretary. Headquarters, 414 Beacon Life Building, Tulsa. Company will operate 6000-barrel refinery at Allen, Oklahoma, formerly run by White Oak Corporation. P. I. Tinkler, superintendent refinery.

Refinery: Direct Oil Refinery, Ltd., Winnepeg, Canada, is building small refinery, Harbison Avenue, Elmwood section, Winnipeg. Cost reported $30,000.

Refinery: U.S.S.R., Russia, has begun work on first oil refinery to supply Siberia, at Orsk, to run Emba crude, to have capacity of about 12,000 barrels daily.

Modernize: Sinclair Refining Company directors appropriated $2,500,000 to modernize Kansas and Oklahoma refineries; to resume operations at Argentine (Kansas City, Kansas) refinery, and install cracking units, vapor recovery and stabilization system. Additions at Sand Springs, Oklahoma, and Houston, Texas, plants.

Construction: Shell Petroleum Corporation Houston refinery, has completed installation of Dubbs combination topping and cracking system absorption gasoline recovery plant, new tankage and minor equipment, ending $1,000,000 expansion program.

Refinery: Lion Refining Company, J. A. Jonas (manager) and M. Poltkins, owners, has completed 250-barrel skimming plant, Calgary, Alberta, Canada.

Acquisition: Phoenix Refining Company, San Antonio, has purchased the 1000-barrel Houston refinery of Crescent Oil & Refining Company and plans addition to capacity.

Refinery: Standard Oil Company of New York (Socony-Vacuum Corporation) again reported considering plans for construction of large, modern refinery on Staten Island. First to establish large bulk terminal. Indefinite maturity.

Construction: Pure Oil Company at Smith's Bluff (Nederland, Texas) refinery is revamping several of its old Cross cracking units, adding towers and other improvements. A new gasoline recovery system is being installed at the Muskogee, Oklahoma, refinery.

It Keeps the DISCHARGE

from Compressor

CONSTANT

Throttling Regulator

One of 40 regulators produced with skill and care by the pioneer gas regulator manufacturers of America. C-F products, in range and applications, encompass all practical requirements.

When discharge pressure rises, suction is throttled. Thus discharge pressure cannot exceed a fixed point.

Built especially for this service, the C-F Throttling Regulator is entirely dependable in uniformity of action. With performance always punctual as well as precise, it assures ideal compressor operating conditions insofar as constant discharge control is concerned.

The Chaplin-Fulton Mfg. Company

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes, from 1 inch to 24 inches; for all Service, 1 oz. up to 2,000 lbs. Pressure to Square Inch.

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Chicago, Ill.

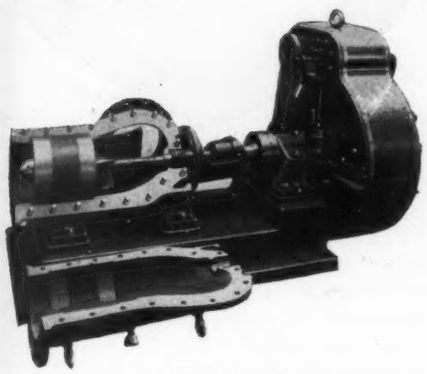
Or Any Jobber

New Equipment for the Modern Plant

1. Propeller Pump

DE LAVAL STEAM TURBINE CO.

De Laval Steam Turbine Company, Trenton, N. J., announces a propeller type pump for handling relatively large volumes of liquid against comparatively low heads, which can be operated at rotative speeds which are much higher than those suitable for ordinary centrifugal pumps. The liquid flows through the pump in smooth lines, without abrupt turns or change of direction. In a properly designed pump of this type, the liquid enters and leaves without turbulence or shock and the efficiency is high.



Propeller pump with casing cover removed, showing guide vanes and wearing sleeve surrounding the propeller

The De Laval propeller pump is built for both horizontal and vertical installation and is available for all capacities and for heads up to about 40 feet. It is suitable for direct connection to a standard speed electric motor or steam turbine, or a speed reducing gear may be used. Its applications include circulating condenser cooling water, lifting storm water in drainage and sewage systems, irrigation service, and, in fact, all purposes within the head limitations.

The pump casing consists of two parts, which are separated in the plane of the center line of the shaft by a flat joint, that is maintained air and water tight by a thin paper gasket. The pump case cover can be lifted off to render the propeller and all interior parts accessible. The propeller is designed for the specified conditions of capacity, head and speed, and is finished on all surfaces, the blades being carefully filed and scraped to templates to insure the shape required by hydraulic design. The casing around the propeller is protected by a separate sleeve, which can be renewed should wear occur. This sleeve supports the guide vanes by which the liquid is directed in smooth flow-lines. The shaft is protected from wear by a removable protecting sleeve which extends through the stuffing box and provides a bearing surface for the packing.

2. Control Equipment

THE MERCON REGULATOR CO.

The Mercon Regulator Company, 1 LaSalle Street, Chicago, announces extensions to its line of flow controllers. The company has formerly manufactured constant flow regulators, flow limiting regulators, and proportioning regulators for the more general applications involving fluid mixing problems. The new line is broadened to include regulators for maintaining proportional flow of liquids where the two liquids do not mix or if mixing may do so at process points remote from the point of desired control.

3. Cracking Process

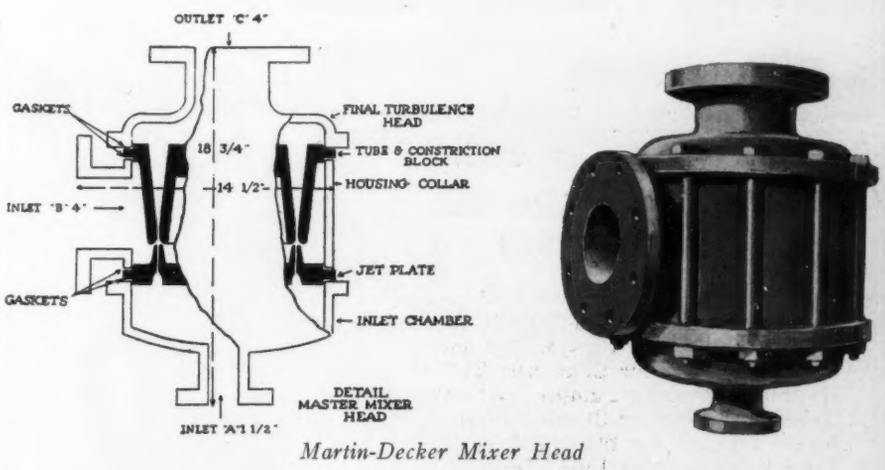
LINCOLN CLARK

Lincoln Clark, 646 South Madison Avenue, Pasadena, California, has announced a new process called the Clark Vapor Phase Process for the production of high octane rating gasoline, for which Mr. Clark owns and controls all patents. The process is designed, according to the inventor, to treat any of the usual overhead stocks, or if desired, will crack or reform gas, gasoline, naphtha, kerosene, stove distillate and gas oil. Octane numbers from 75 to 100 are claimed, and it is said, the process is inexpensive in construction and is continuous in operation eliminating the necessity of shutting down to clean-out.

4. Mixer Head

MARTIN-DECKER DEVELOPMENT COMPANY

Martin-Decker Development Company, 3431 Cherry Avenue, Long Beach, California, announces acquisition of the Master Mixer Head, with improvement in design and changes in sales policy. The Master Mixer Head finds application in continuous and semi-continuous treating of gasoline, kerosene and other petroleum distillates, in processes requiring agitation, in air reduction of oils, dehydration processes, transfer work in evaporating towers and fractionation equipment, shell and pipe stills, compounding and blending. The head is made of cast iron (or other



Martin-Decker Mixer Head

— — — — — — — — **MAIL COUPON** — — — — — — — —

REFINER AND NATURAL GASOLINE MANUFACTURER,
Houston, Texas, U. S. A.

Please see that I am supplied, without obligation, additional information on New Equipment Items Nos.....described in September, 1932, issue of REFINER.

Name .....

Company .....

Address .....

Square and Triangular Mesh

Floor Gratings and Stair Steps

The strongest and lightest

Bridge and Floor Slabs
(Monolithic)

Catalogue and Prices on request.

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See Telephone book for Representatives

metals to suit requirements) with a jet plate of hardened steel, weighing overall 275 pounds. It consists of an inlet chamber, jet plate, housing collar, tube block and final turbulence chamber. The high turbulence enacted at restrictions secures intimate contact and mixture between the substances being admixed, which secures desired efficiencies in all types of chemical treating or mixing and blending.

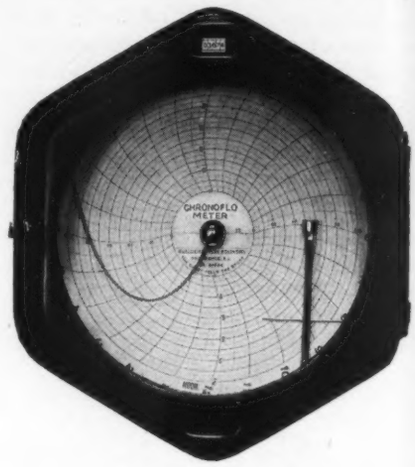
5. Chronoflo Meter

BUILDERS IRON FOUNDRY

Wide measuring range, accuracy, and abundance of power are features of the new Chronoflo meter which Builders Iron Foundry, Providence, Rhode Island, has announced, according to the 12-page illustrated Bulletin No. 261 which describes the operation and construction of this unique electrically-operated meter. Specifically, a chart record reliable to one-twelfth the maximum rate and a total flow register accurate to one-twentieth of the maximum flow is promised. This will appeal to all who use flow meters on steam, air, gas, and liquid lines which are wide seasonal, day and night, or hourly variations in the rate of flow.

The Chronoflo instrument, which may be used with either a Venturi tube or an orifice plate, utilizes four products of modern electrical research—the telechron motor, mercury switch, power relay, and electro-magnetic clutch—as the foundation for its operation.

Essentially the instrument consists of a Telechron driven contact device controlled by the height of the mercury column in the mercury unit (i.e. the rate of flow through the orifice or Venturi tube) and



Chronoflo Meter

a Telechron driven register-recorder which is in operation during the exact time that the mercury switch is "on" in the mercury unit. The mercury switch is sensitive to minute changes in mercury level; the power relay instantaneously transmits the contact engaging the Telechron drive with the integrating and recording movement through the electri-magnetic clutch.

Thus the Chronoflo utilizes the accuracy of the Telechron, and the equally important fact that this accuracy is exactly duplicated by other Telechrons anywhere on the same frequency controlled electrical system. For the meter user this means that there are practically no limits to the distance allowable between the pipe line and the register-recorder for exceptionally long distances the standard public telephone system circuit can be used.

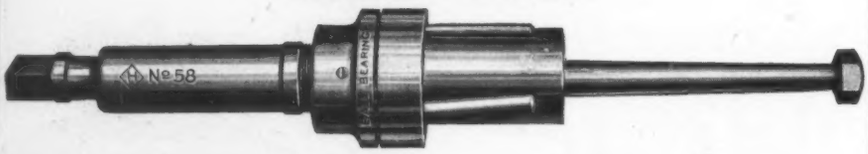
Other features include the hexagonally-shaped case which makes an especially pleasing appearance on the panel and allows the use of a long side hinge which, in turn, allows the mounting of all the working parts on a single plate which can be swung out from the case for easy inspection.

6. High Temperature Distillation

ANALYSIS PODBIELNIAK ANALYTICAL AND RESEARCH LABORATORIES

High-Temperature Fractional Distillation Analysis Podbielniak Analytical and Research Laboratories, 112 North

Heavy Duty Expanders for Still Tubes



Tools for the Oil Industries

Hydraulic Pressure Pumps, 8000 pounds
Tube Expanders for Cracking Still Tubes
Hydraulic Pressure Pumps, 2000 pounds
Tube Expanders for Condenser Tubes
Hydraulic Pressure Pumps, 500 pounds
Tube Expanders for Steam Boilers
Screw Punches for Structural Shapes
Tube Expanders for Pipe Work
Screw Punches for Plate Work
Flaring Tools for Still Tubes
Beading Tools for Still Tubes
Hydraulic Jacks
Hydraulic Punches

A. L. HENDERER'S SONS
Wilmington, Del.
Established 1870
Expanders since 1884

Lansing Street, Tulsa, Oklahoma, announces Models B and C. Podbielniak High-Temperature Fractional Distillation Analysis Apparatus have been developed for the accurate and complete analysis of absorption oils, motor fuels, petroleum crudes, commercial solvents, light oils and similar complex liquid mixtures by precise fractional distillation. The two apparatus differ only in that Model-B has provisions for a complete range for vacuum distillations from 1,000 mm. down to as little as 1.0 mm., while Model-C can be used only for atmospheric distillation.

The apparatus may be used in the design and control of oil absorbers, fractionating towers, cracking units and other natural gasoline plant and petroleum refinery equipment; for the complete analysis of light oils, commercial solvents and complex organic liquids; for use in research and standardization work of all kinds on complex liquid mixtures.

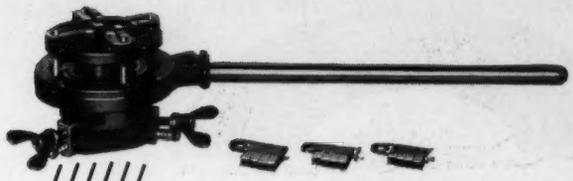
The apparatus may be used to stabilize 2000 cc. of natural gasoline or of pressure distillate, the residue to be used for anti-knock and other tests, to fractionate sample of lubricating oils (by vacuum distillation) to determine the "spread" of boiling point and of viscosity, to fractionate large motor fuel samples (2000 cc. or larger) for the purpose of testing fractions for anti-knock qualities; or it may be used for the rapid precise analysis of 100 cc. samples of motor fuel.

Special features of the apparatus are extreme sharpness of fractionation (sufficient to separate compounds boiling as little as 5°C. apart); an enormous distillation range of —180°C. to 500°C. (temperature) above 300° are corrected from vacuum distillation to atmospheric pressure) for Model -B and —180°C. to 300°C. for Model -C; an accuracy of 0.1 per cent or better under favorable conditions; great range of sample capacities and of distillation characteristics due to the use of a two-part fractionating column with a variety of interchangeable distilling tubes used with a standard sleeve-type vacuum jacket. The apparatus are designed for intensive routine industrial work as well as for the most exacting research work.

7. Viscometer

AMERICAN INSTRUMENT CO.

American Instrument Company, 774 Girard St., N. W., Washington, D. C., announces the Vogel-Ossag Viscometer for the direct, accurate measurement of absolute and kinematic viscosities without conversion. It is the only instrument for this purpose admitted for calibration by the German State Physical



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1 inch to 2 inch—

—threading tools, "TOLEDO" No. 1B plain and No. 1BR ratchet.

No bushings. Large wing-head thumb screws with micrometer line guide bars easily clamp the broad-face chuck jaws tight on the pipe. Straight, clean cut, leak-proof threads perfectly tapered are assured. Use regular No. 1 and No. 1A dies—the easiest cutting dies known. Thread iron or steel, brass or copper pipe. Will not mar polished pipe. See your dealer or write for complete information.

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TOLEDO, OHIO — NEW YORK OFFICE, 72 LAFAYETTE ST.

"TOLEDO"
PERFECT CENTER

ROTO TUBE CLEANERS

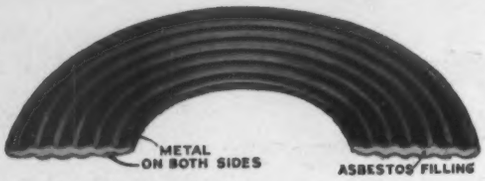
built for* Oil Still Tubes, 3″ I. D. *and up

Roto Special 6-way Drill Head and Universal Joint.

Roto Air Driven Cleaner with Swing Frame Head attached.

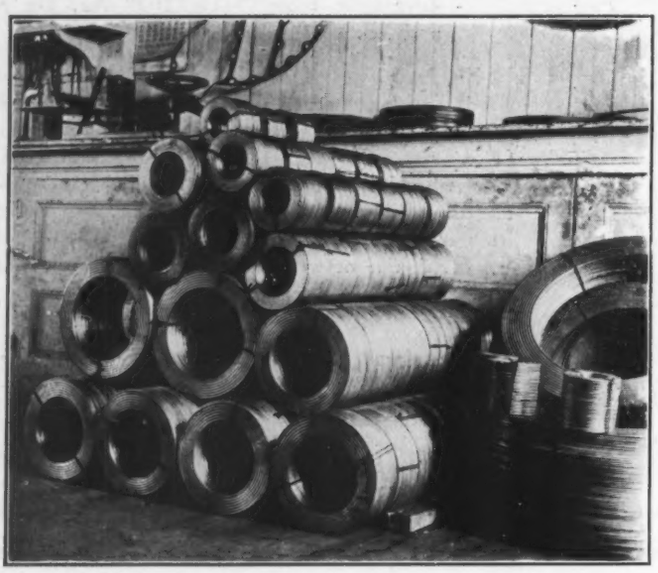
Roto Combination Head and Universal Joint.

THE ROTO COMPANY
Sussex Avenue and Newark St., Newark, N. J.



METALLO
STYLE 1000 » »

REFINERY TYPE
METAL-ASBESTOS
GASKETS



Recent shipment of 3,180 Metallo Style 1000 Refinery Type Gaskets for Series 30 flanges

Whether you use Dubbs, Cross, Tube and Tank, Jenkins or Lewis Cracking Process, you can rely implicitly on Metallo Refinery Style 1000 Gaskets for all tongue and groove, male and female joints, and extra heavy flanges. Constructed with double jacket of corrugated Armco Iron, Steel, Monel Metal, Aluminum, Copper or Chromium Alloys, with filling of Asbestos, it is particularly adapted for any joints on cracking stills where pressures are up to 2,000 pounds, and temperatures up to 2,000 degrees Fahrenheit.

Write for Prices.

METALLO GASKET CO.

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Enter my name for subscription to The Refiner and Natural Gasoline Manufacturer for which you will find enclosed check for

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***You can save yourself the trouble of sending another check one year hence by sending check for $2.00 for 2 years.*

Laboratory and is now admitted for calibration by the United States Bureau of Standards.

Complete viscosity - temperature curves may be determined with the instrument without disturbing the set up. Only 15 c.c. of the material are required for making a test.

Engler, Redwood, and Saybolt viscosities may be accurately obtained from either of these readings by means of a simple conversion table supplied with the instrument. The Vogel-Ossag Viscometer hence also provides an absolute standard for checking oils and for checking routine test instruments for accuracy.

8. Barrel Truck

CLARK TRUCTRACTOR COMPANY

A special machine for handling barrels, kegs, drums and rolls has been introduced by the Clark Tructractor Company, Battle Creek, Michigan. The powerful mechanical hand (adjustable for packages of different size) palms the barrel neatly, tilts it back slightly to insure easy riding, and the truck travels with its load at a rate of from one to six miles per hour. At its destination a two-ton load may be tiered as high as 50 inches in 20 seconds, the lifting and tilting mechanism being operated by hydraulic pressure supplied through an oil pump. This barrel handling machine is regularly built on the Clark two-ton tiering truck equipped with rear-wheel drive and four-wheel steer, but can be supplied on other Clark tilt truck models and may be built to tier higher than 50 inches.

The rig is gas driven to insure 24 hours' continuous operation. The power plant is a four-cycle, 25 horsepower tractor type motor. Wide tires insure smooth operation and the compact construction makes it possible to use the truck in narrow aisles and on crowded platforms. It negotiates ramps easily and is particularly useful in moving barreled goods in the warehouse and in loading freight cars.

Clark Tructier with Barrel Handling Device

9. Control for Maintaining Liquid Level

SHAND & JURS

Shand & Jurs, Berkeley, California, announces a junior type liquid level control. It is equipped with a connecting link which permits reverse action on the diaphragm valve.

This control is also made in a master type for controlling extremely sensitive conditions such as interface work. In the latter service a different type of float is used.

Floats of various sizes are used to assure satisfactory working conditions. Where the control is mounted directly onto a nozzle on the container, it is possible to use floats in sizes up to 10", and with any desired length of float arm.

Any combination of signal lights may be applied. The method of attaching a Mercoid switch for controlling the lights is comprised of a special pointer which contains the brackets for holding the Mercoid Switch. The entire unit may be enclosed in a metal box for protection.

10. Automatic Combustion Indicator-Recorder

C. J. TAGLIABUE MANUFACTURING COMPANY

The C. J. Tagliabue Manufacturing Company of Brooklyn, is offering a new all metal automatic flue gas analyzer known as the Tag-Mono indicator-recorder.

The instrument not only indicates and records the percentage of CO_2 but also gives an accurate record of the percentage of combustibles, such as $CO+H_2$ which may be present in the flue gases. This is conceded to be extremely important in getting the whole story of what is taking place in the furnace.

The company reports that this new Tag development works on the orsat principle, analyzing chemically and indicating and recording electrically and is surprisingly simple in design. The large illuminated dial and pointers can be easily seen at a distance of 30 feet, and in addition the records are made on a nine-inch, 24-hour circular chart with open graduations inviting a precise study of the continuous performance curve.

Tagliabue Combustion Indicator

Gas Masks

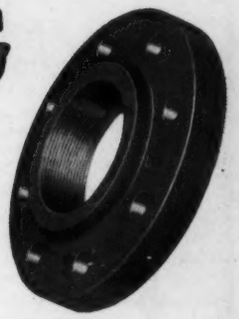
E. D. Bullard Company, 275 Eighth Street, San Francisco, has issued an attractive and informative 16-page booklet titled "Gas Masks," and covering the subject of safety in hazardous places around refineries, tank cars, storage tank farms and plants where poison gas is likely to be present. The simplicity of using the masks is shown as well as numerous examples of the necessity of wearing gas masks.

JUST BE SURE THIS TRADE MARK APPEARS ON THE PIPE FLANGES YOU BUY

that's the first and foremost rule in the minds of many of the oil fields' largest users

HARRISBURG drop forged pipe flanges assure the user utmost satisfaction. The Harrisburg trade mark on a flange is a surety of dependability . . . a mark worth looking for, worth demanding!

HARRISBURG *Drop Forged* FLANGES



Our new flange catalog-booklet is ready. Send the coupon for your copy of "Harrisburg Drop Forged Flange Facts." A mighty valuable thing to have in your files.

Harrisburg Pipe & Pipe Bending Co.
Harrisburg, Pennsylvania

Sales Agents:
W. R. McDonough Co., National Bldg., Cleveland
Mid-Continent Supply Co., Fort Worth
W. P. Paul Company, Drexel Bldg., Philadelphia
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Hy-Speed ELECTRIC MIXERS

For Mixing:
Lubricating Oils
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Lime and Oil
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Fuller's Earth and Oil
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All Liquid Chemicals

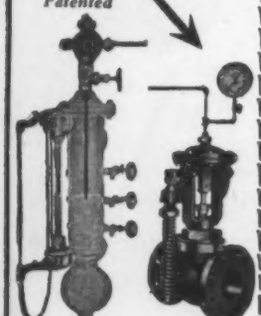
"Hy-Speed" Portable Electric Mixers blend, compound, mix or agitate all oils and liquid chemicals . . . better and more economically.

They clamp to any tank or vat . . . require no installation. Capacities from 5 to 50,000 gallons.

Write for your copy of our new catalog today!

ALSOP ENGINEERING CORP.
39 West 60th Street, New York City

"Yes, the Feedwater is O. K.," says . . . . .
the refinery engineer as he glances at the indicator of the
CAMPBELL Boiler Feed Regulator
Patented



In addition the CAMPBELL has other exclusive features which make it ideal for refinery service. No floats. No thermostats. No generators. No links. No moving parts in the regulating element. No fine adjustments. Guaranteed. Use the coupon at the right.

ATLAS VALVE CO.
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Without the slightest obligation, please send information, including prices, on the following Atlas products:—
☐ Pump Governors
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☐ Control Valves
☐ Campbell Boiler Feed Water Regulator
☐ Reducing Valves
☐ Damper Regulators
☐ Temperature Regulators
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Street.....
City.....
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ITEMS ABOUT MANUFACTURERS

DAVID POWELL

Detroit Graphite Company announces appointment of David Powell as manager of the Oklahoma district sales and distribution. Mr. Powell, who was in charge of the company's Kansas City office for 12 years, will be located in the Philtower Building, Tulsa.

Podbielniak Analytical and Research Laboratories of Tulsa, Oklahoma, make the following announcements:

1—A 12-page circular No. 7 and 16-page price list No. 70 announcing and describing the Podbielniak High-Temperature Fractional Distillation Analysis Apparatus—Models B and C and other apparatus have just been issued.

The Podbielniak Analytical and Research Laboratories have moved their office and laboratories from the 12th floor of the Medical Arts building to a two story brick building located within the grounds of the Oklahoma Iron Works, the new address being 112 No. Lansing Street, Tulsa, Oklahoma (mailing address P. O. Box No. 567).

The new location provides additional space and improved facilities for the manufacture of the Podbielniak High and Low Temperature Fractionating Apparatus and other products now being made commercially available, as well as better facilities for general testing of natural gas, and gasoline, lubricating oils, petroleum crudes, and for research work.

General Refractories Company, Philadelphia, announces that an arrangement has been concluded with McLeod & Henry Company of Troy, New York, whereby it is in position to offer to the trade the "Carbex" (Silicon Carbide) commodities manufactured by McLeod & Henry Company.

Black, Sivalls & Bryson, Inc., has moved its general offices from Bartlesville, Oklahoma, to its own new office building, located at 2131 Westwood Boulevard, Oklahoma City. The general offices of the company and its manufacturing subsidiary are now consolidated in the same building.

The general offices of this company have been located in Bartlesville since 1904. Because of the erection of the American Tank & Equipment Corporation's new plant at Oklahoma City, it was decided to merge the general offices of the two companies for greater efficiency and economy.

Several years ago Black, Sivalls & Bryson, Inc., purchased American Tank Company of Oklahoma City, and built a new, modern welding plant, which building itself is unique in that it is an all welded structure. This plant is the only one west of the Mississippi River, which is in position to fabricate and anneal high pressure, high temperature vessels used in the refinery industry.

In addition to the mammoth shop, the company has built and maintains the largest heat treating oven west of the Mississippi which is 80 feet long, of sufficient length and size to house a Pullman car.

The new office building at Oklahoma City of Black, Sivalls & Bryson, Inc., and its manufacturing subsidiary, American Tank & Equipment Corporation

CATALOGS . . . BULLETINS

Helpful Publications Which Manufacturers Will Be Glad to Send Free for the Asking

Copper Plated Gaskets

The M. W. Kellogg Company, 225 Broadway, New York, New York, has for distribution a four page, illustrated bulletin describing "Kell-Raph" copper plated gaskets for high pressure, high temperature pipe joints.

Refinery Pumps

Bulletin D-111-S4 just issued by the Worthington Pump and Machinery Corporation, Harrison, N. J., contains illustrations and a complete description of the HIVOL Pump which the company offers as a distinct advance in refinery pumping equipment. The pump is designed for high volumetric efficiencies on highly volatile liquids.

Multi-stage Pumps

De Laval Steam Turbine Company, Trenton, New Jersey, has ready for distribution Catalog B-5 dealing with its complete line of multi-stage centrifugal pumps with single suction impellers. Pumps are described up to seven stages in one casing and for heads up to 1600 pounds per square inch. Special designs are discussed for handling high temperature fluids.

Stainless Steel

The American Sheet and Tin Plate Company, Pittsburgh, has just issued a new booklet "American U. S. S. Stainless Steel Sheets and Light Plates" describing its various steel alloys and their application in industry.

ENGINEER with twenty years experience in the petroleum refining and production, establishing sales office in Texas for Mid-Continent business. Desire some active accounts. Thoroughly acquainted with oil industry. At present connected with New York company. Address Box No. 406, Refiner, Gulf Publishing Company, 3301 Buffalo Drive, Houston, Texas.

BURRELL-MASE ENGINEERING COMPANY

Design, Construction, Valuations, Tests, Reports, Researches.

Law and Finance Building

PITTSBURGH, PA.

Electrically Driven Centrifuges
Hand Centrifuges

WRITE

WILLIAMS, BROWN & EARLE, Inc.

Manufacturers of Laboratory Apparatus

918 Chestnut St. Philadelphia, Pa.

The Caravan Candle Co., Maitland, South Africa, are calling for quotations to supply them with Refined Paraffin Wax and Stearine, the former in 100-ton lots monthly and the latter proportionately, on Letter of Credit or Sight Basis. Write Direct.

Tank Heater

Griscom-Russell Company, 285 Madison Avenue, New York, announces publication of a pamphlet describing its new G-R G-Fin Storage Tank Oil Heater, for heating viscous oil to be withdrawn from field tanks, tanks on shipboard and other types of oil storage tanks.

Safety Shoes

Mines Safety Appliances Company, Pittsburgh, is distributing Bulletin 115 describing M-S-A Safety Shoes and Pacs giving details of fabrication, size range and prices.

Steel Products

Bethlehem Foundry & Machine Company, Bethlehem, Pa., is distributing a complete new set of bulletins covering Bethlehem standard processing vessels, thermocoil apparatus, accessories, materials of construction and Wedge Roasters.

Welding

Hedges - Walsh - Weidner Company, Chattanooga, Tenn., is distributing in pamphlet form a reprinted article by A. J. Moses "History and Development in the Art of Welding Ferrous Metals."

Scales

Kron Company, Bridgeport, Conn., has published a new series of bulletins describing its line of scales, including pitless suspension types, hanging pan, track scales, portable pan, platform, bench, attachment, hopper, heavy duty portable platform and crane scales. Pictorial industrial applications are presented.

Stainless Welded Tube

Carpenter Steel Company, Welded Alloy Tube Division, 100 Broadway, New York, is distributing a bulletin presenting general engineering information, physical properties, working instructions, etc., of its stainless welded tubing, made from cold rolled stainless strip steel.

Governors

Northern Equipment Company, Erie, Pa., has issued folder No. 129 describing its Type SDS-2 governors, for controlling pressures from 15 to 150 pounds. It is applicable for installation on simplex, duplex, turbine-driven or centrifugal pumps.

Blowers

The Connersville Blower Co., Inc., Connersville, Indiana, announces availability of the following bulletins: Bulletin 21-B21, covers an application of Victor-Acme Blowers in furnishing vacuum for cleaning and drying barrels, drums and tanks; Bulletin 21-B22, covers an application of R-C-W Vacuum Pumps, of different types, in priming centrifugal pumps, especially large sizes.

Pipe and Fittings

Taylor Forge and Pipe Works, P. O. Box 485, Chicago, announces a bulletin, "Taylor Forge," describing the various products it manufactures for the oil and gas industry, including forged steel pipe fittings, welded pipe, spiral pipe, boiler nozzles, still flanges, steel rings, etc.

Multi-Speed Squirrel-Cage Motors

Wagner Electric Corporation, 6385 Plymouth Avenue, St. Louis, Missouri, has available a six-page bulletin, No. 174, illustrated with installation photographs, each installation described as to problems involved and the type of motor meeting them; the description covers constant-torque, constant-horsepower and variable-torque motors, further classified as two-speed, three-speed and four-speed motors.

Flanges

Harrisburg Pipe and Pipe Bending Company, Harrisburg, Pennsylvania, has recently published for distribution a 32-page, illustrated catalog titled "Harrisburg Drop Forged Flange Facts" containing descriptions of low hub flanges, Van Stone flanges, slip-on flanges, butt welding flanges, blind flanges, and Ludlow flanges.

Roller Bearings

Hyatt Roller Bearing Company, Newark, New Jersey, has issued a new 48-page bearing application book, designated as "Bulletin 100." Contents of Bulletin are divided into four sections covering: wound roller type bearings, solid roller type bearings, single row radial bearings, and lubrication data. Included in the bearing sections are dimensions and load rating tables, together with typical mounting drawings, applicable to each respective type of Hyatt. product. Several other pages are devoted to elements of bearing design, selection, load computation, correct assembly, and so on.

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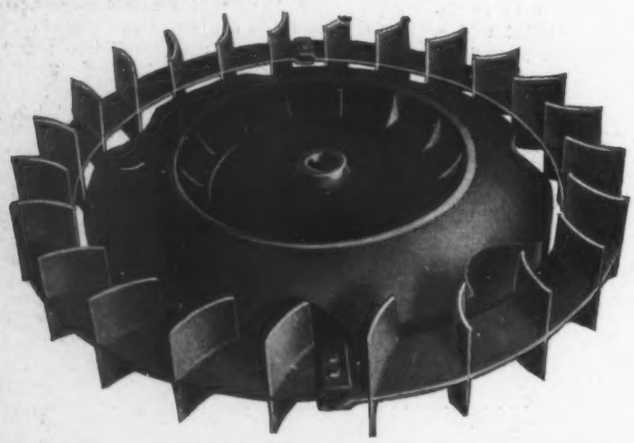

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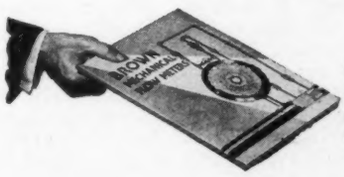

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DR. E. H. LESLIE and DR. H. B. COATS

The abstracts here presented are selected from the current literature of science and technology to afford reference to fundamental information not easily available to all readers. Abstracts of articles appearing in readily obtainable trade journals are not included.

Photostat copies of original articles will be supplied at cost by the Leslie Laboratories. Complete or limited bibliographies covering special topics by title, by abstract, or in complete manuscript, will also be prepared and furnished at reasonable cost by the Laboratories.

Fundamental Physical Data

Conductivity of Oils at Low Temperatures. A. GEMANT, *Z. Physik* **75** (1932) pp. 613-21.

The conductivity of several technical mineral oils was determined at temperatures from room temp. to —60°C. by use of a highly insulating electrometer valve as a continuous-current amplifier. If the log of the conductivity is plotted against temperature an S-shaped curve is obtained in some instances. This is interpreted as indicating a transition from the ordinary liquid state to one of structural regularity at low temperature.

Chemical Composition and Reactions

Acids of Caucasian Petroleum, A. E. TSCHITSCHIBABIN ET AL, *Bull. Acad. Sci. U.S.S.R.* 1932, pp. 203-24.

The crude naphthenic acids from Caucasian petroleum were freed from hydrocarbons and separated by fractionation of their methyl esters. Isoamyl-acetic and B-B-diethylpropionic acids were identified in the low boiling fractions. The acids boiling above 215°C. contain increasing proportions of cyclic acids and no fatty acids were found in fractions boiling above 260°C. Fractional precipitation of the cadmium salts was used as a method of separation. Cyclohexane carboxylic acid was definitely identified and cyclopentane-carboxylic acid was probably present. The fatty acids present are mainly primary, and the alicyclic acids largely secondary. Tertiary acids were not identified. The naphthenic acids contain optically active components.

Oxidation Mechanism of Mineral Oils. T. YAMADA, *J. Soc. Chem. Ind., Japan,* **35** (1932), p. 202B.

The oxidation of mineral oils is accelerated by benzoic, stearic, oleic, and naphthenic acids and also by the acid oxidation products of petroleum in a closed vessel. It is not accelerated by oxalic acid nor by the products of oxidation of petroleum contained in an open vessel.

Polymerization and Decomposition of Acetylene Hydrocarbons. G. EGLOFF, C. D. LOWRY AND R. E. SCHAAD, *J. Phys. Chem.* **36** (1932) pp. 1457-1520.

A comprehensive review of the published work on the decomposition and polymerization of acetylene. It covers the effect of heat with and without catalysts, and with and without admixture of other gases, and the reactions of the higher acetylenes. A bibliography of 213 references is included. The reactions of the acetylenes are summarized in tabular form.

Manufacture: Processes And Plant

Studies in Distillation, J. S. CAREY AND W. K. LEWIS, *Ind. Eng. Chem.* **24** (1932) pp. 882-3.

The composition of the vapor and liquid in equilibrium at different concentrations was determined for the system ethyl-alcohol-water by using the method of continuously recycling the distillate. Data are given in tabular and graphical form.

Flow in Pipes in the Critical Region. E. S. L. BEALE AND P. DOCKSEY, *Jour. Inst. Pet. Tech.* **18** (1932) pp. 607-25.

This is a study of the phenomena of fluid flow through the range of conditions of the critical region and under conditions of layout and pipe-roughness closely simulating conditions of practice. The S-shaped curve in the critical region was obtained. The apparatus and method used are described. A family of Stanton curves is given for conditions varying from the smoothest to the roughest. The data of the authors on relatively small pipes and water check well with data taken by the Anglo-Persian Oil Co. on natural gas lines in Persia. Data are given for effects of pipe-ends and elbows. These check the results of Lewis, McAdams, and Seltzer except in the critical region where they are higher.

Determining Friction Losses in Piping Systems. M. J. REED AND L. H. MORRISON. *Chem. & Met. Eng.* **39** (1932) pp. 446-8.

A discussion of friction losses in pipe lines, with presentation of formulas and friction factor chart. The effect of elbows and fittings is stated to be less than as ordinarily taken. Globe valves should not be used in a pumping system on account of the high pressure drop through them. Formulas for the drop through valves are given.

Progress in Hydrogenation of Petroleum During 1930 and 1931. E. J. GOHR AND R. P. RUSSELL, *Jour. Inst. Pet. Tech.* **18** (1932) pp. 595-606.

Standard Oil Plants at Bayway and Baton Rouge are described and illustrated. Oil and compressed hydrogen are passed through heat exchangers to a coil furnace and thence to a reaction chamber filled with sulfur-resistant catalyst. Ordinarily a pressure of about 3000 pounds is maintained on the chamber. The degree of hydrogenation is regulated by controlling the working conditions. From the reaction chamber the products and gases pass through exchanger to a high-pressure separator. The gas is recompressed. Gases formed in the process are largely removed in solution in the liquid products, but in some instances the gas must be scrubbed with oil before re-use of the residual hydrogen. Hydrogen can be made by various methods but where hydrocarbon gases are available is made by the reaction of the methane with water vapor. The carbon monoxide first formed along with hydrogen is removed by reaction with water vapor to from CO_2 that can be removed by scrubbing. No coke is formed in hydrogenation and the catalyst is rugged. At time of writing the Bayway plant has been on continuous operation for a year. The products require little chemical treatment. Typical tests of finished products are given. In the past two years methods of catalyst manufacture have been improved and 150 or more charging stocks have been studied so that it is now possible to predict type of feed stock for maximum yield of a given quality product. The types of reactions involved in the hydrogenation process, purification, stabilization, and homogenization are briefly discussed. The possibilities of hydrogenation as a means of adjustment of properties to those desired is noted. Six important applications of hydrogenation to current refinery problems are stated and illustrated with examples, giving yields and qualities.

Petroleum Tank Coatings. BRIAND MEAD, *Ind. Eng. Chem.* **24** (1932) pp. 857-59.

The importance of protection of tank interior surfaces against hydrogen sulfide corrosion is emphasized. The ferrous sulfide formed is so readily oxidized as to constitute a menace from the standpoint of fires or explosions. The most satisfactory panel test procedure involves placing the panels inside the tank close to the roof. A satisfactory paint should be non-poisonous, rapid drying, self-hardening, light colored, cheap, unaffected by water, water vapor, or steam, unaffected by hydrocarbons, resistant to hydrogen sulfide, resistant to wide temperature changes, unaffected by air, and must be applicable by spraying to bond well to steel. The

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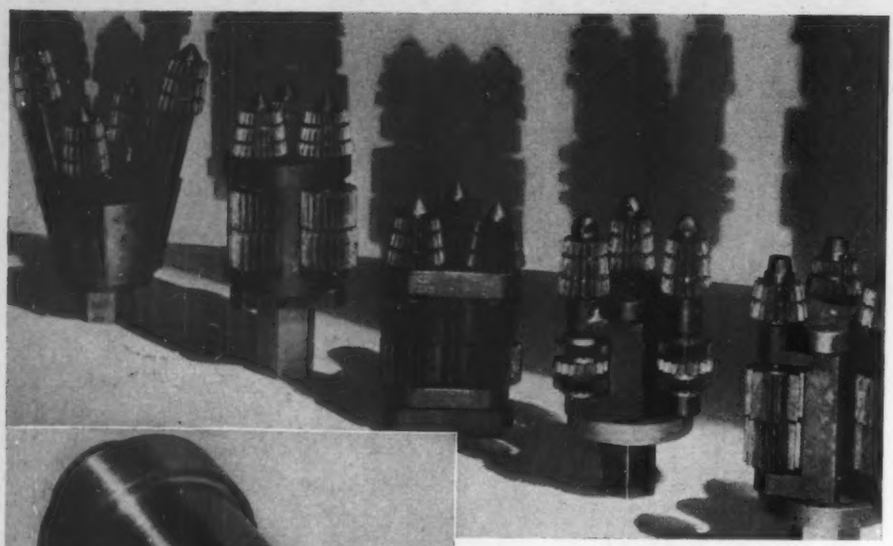

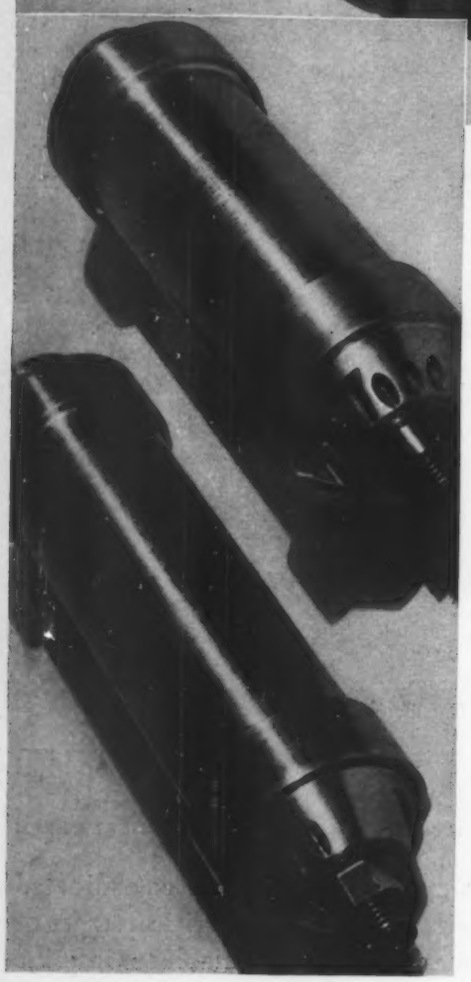

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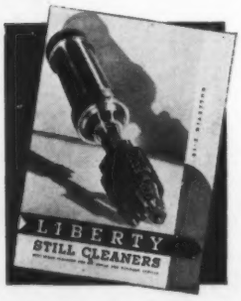

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coating should give two or three years service on crude tankage and one year on sour distillate tankage. No coatings have been yet found that are wholly satisfactory. Some of the later types of synthetic resins are promising. Reasons for the failure of various types of coatings are briefly outlined.

Regulating Natural-Gas Fires for Best Efficiency. N. E. EBAUGH, *Power* 75 (1932) pp. 656-7.

When natural gas is used as fuel the heat losses that occur are: (1) Radiation from the furnace setting. (2) Heat lost in the flue gases. The latter is of three kinds: (a) combustible gas, (b) high temp. of flue gas, and (c) water vapor. A chart is given showing the relationship between CO_2, O_2 and CO in the flue gas and excess air for a Louisiana gas containing CH_4 96.5%, C_2H_6 0.0% N_2 2.1% and CO_2 1.4%. A chart is given that shows the heat loss in relation to stack gas temperature and gas per cent excess air.

Products: Properties and Utilization

The Toxicity of Motor Fuels and Their Combustion Products. W. LIESEGANG, *Angew. Chem.* **45** (1932) pp. 329-30.

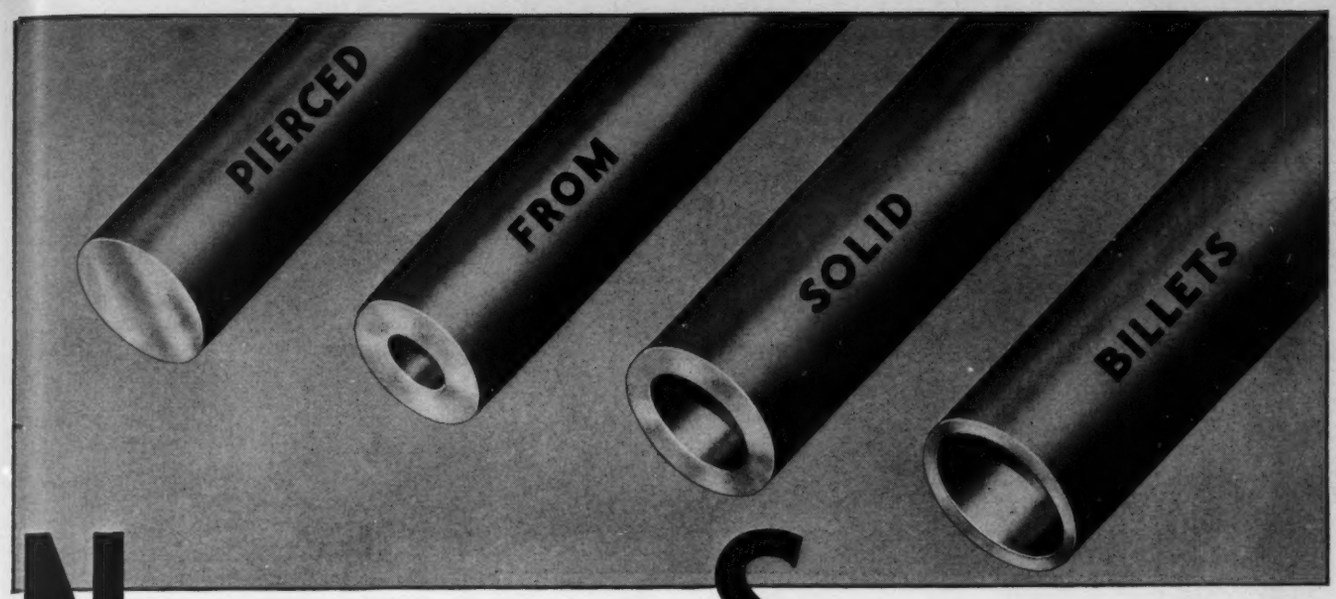
Investigators agree that the toxicity of the combustion products of motor fuels is not affected by the composition of the fuel used as to its content of gasoline, benzine, or alcohol. Gasoline hydrocarbons as such have a narcotic effect, the least volatile being the most poisonous. The quantities of the individual hydrocarbons that have the same affect on mice are: Pentane 0.377 g., hexane 0.147 g., heptane 0.064 g., octane 0.037 g. The toxicity of benzine is substantially the same as octane. Methyl alcohol is more poisonous, and also more dangerous because of its low bp., 65°C. Its use, as contemplated in Germany, as a component of a national fuel would probably increase the hazard of the fuel.

Knocking Properties of Motor Fuel and Its Prevention. II. Relation Between Anti-Knock Values and Chemical Constitution of Organic Compounds. E. ENDO, *J. Fuel Soc. Japan* **11** (1932) p. 53.

The anti-knock properties of 150 non-metallic organic compounds were determined. Nitrogen and hydroxyl compounds possess anti-knock properties. Ethers and aldehydes promote knocking. Ketones and esters are intermediate. The tendency to knock increases with the length of the carbon chain in aliphatics. For the same compound the normal compound is of higher anti-knock value than its isomers. The addition of NH_2 or OH groups directly to a benzene ring increases the anti-knock value but decreases it if the addition is to a side-chain.

Flame Radiation and Temperature Measurements on an Internal Combustion Engine. A. E. HERSEY, *Ind. Eng. Chem.* **24** (1932) pp. 867-70.

The difficulties involved in the measurement of flame temperature are discussed and the possible methods of procedure outlined. An apparatus for radio metric measurement is described and the results secured by its use are discussed. The data secured are compared to the calculated temperatures of Goodenough and Baker and found to be in fairly good agreement in the region of 90% of the theoretical air-fuel ratio. For lean or rich mixtures the observed temperatures are considerably lower than the



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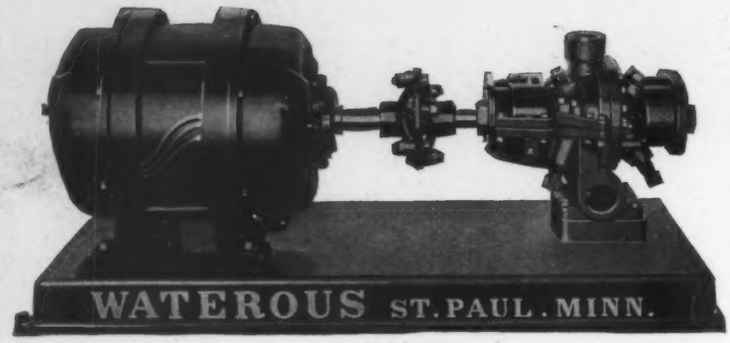

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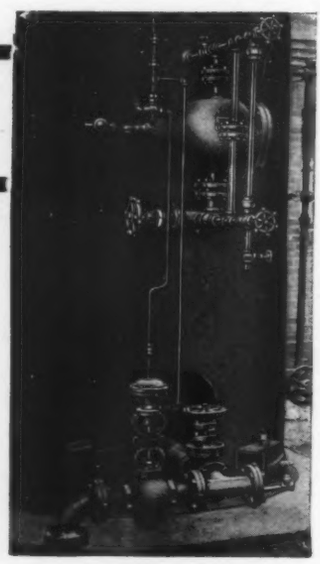

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calculated. The reasons for this are briefly discussed.

Spontaneous Ignition Temperatures of Fuels. F. A. FOORD, *Jour. Inst. Petr. Tech.* **18** (1932) pp. 532-47.

The subject of spontaneous ignition temperatures is of similar importance to the use of compression ignition engines as knock rating to the uses of spark-fired engines. An apparatus and method for measurement of spontaneous ignition temperatures in terms of temperature and time of ignition delay is described. Use of a standard fuel, such as hexahydronaphthalene, to which another substance, such as ethyl nitrite can be added to bring the blend to a standard value is suggested.

Spontaneous Ignition Temperatures of Liquid Fuels and Their Determination (German Investigations). J. L. CHOLONER, *Jour. Inst. Pet. Tech.* **18** (1932) pp. 548-62.

German method, apparatus, and data are given in a detailed review. Opinion as to ignition temperature as a measure of the suitability of Diesel fuel is divided.

Comparison of Spontaneous Ignition Temperatures and Starting and Ignition Delay Tests in Engines. L. J. LEMESURIER, *Jour. Inst. Pet. Tech.* **18** (1932) pp. 562.

Spontaneous ignition temperature tests by the Moore method are useless. Tests by the Farnboro method in which the time factor of ignition is determined at different temperatures gives results that in general grade the fuels in the same order as engine operation, particularly as regards starting qualities. Much work will be required before the testing of Diesel fuses can be standardized.

Ignition Quality of Diesel Fuels. J. J. BROEZE, *Jour. Inst. Pet. Tech.* **18** (1932) pp. 569-76.

Results of time-delay ignition tests are expressed in terms of "cetene" numbers analagous to octane numbers. Cetene ($C_{16}H_{32}$) is the standard of high ignition quality and mesitylene or, preferably, a-methyl naphthalene, of low ignition quality. The cetene numbers of commercial fuels range from 35 to 70. High-speed engines may require fuels of 60 or higher cetene number. Many slow-speed engines will run well on fuels of 35 cetene number. Fuels of high ignition quality do not improve the efficiency of Diesel engines as high anti-knock fuels improve that of the gasoline engine. The trend in engine design is toward the "omnivarous" engine.

Chemical Technical Advances in the Field of Asphalt and Tar Industry. R. KISSLING, *Asphalt Teer Stassenbautech.* **32** (1932) pp. 378-9.

A condensed bibliography and list of patents is given for the year 1931. The preparation of asphalt and emulsions, use of asphalt products, testing methods, and research work in the field are the subjects covered.

Properties of Bitumens of Low and High Paraffin Content. J. MANHEIMER, *Petr. Zeit.* **28** (1932) 16, pp. 1-9.

Bitumens of the same softening point were obtained from Trinidad and Epure natural asphalts and Mexican, Venezuelan, and German petroleum asphalts. The properties were determined and tabulated. Sp. gr. does not deviate widely with source. Flash and fire points and loss on heating are highest for bitumens of high paraffin content. The sulfur in bitumen of low paraffin content has a vulcanizing effect and im-

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FIG. 1460
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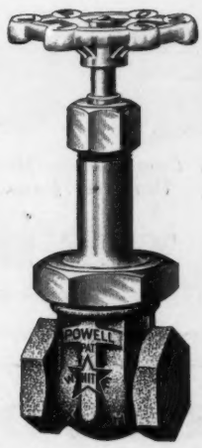

FIG. 377
BRONZE GATE VALVE

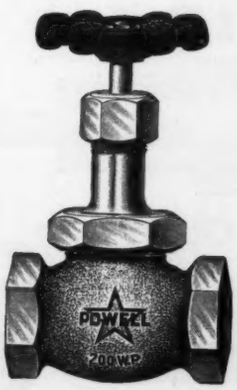

FIG. 110
BRONZE GLOBE VALVE

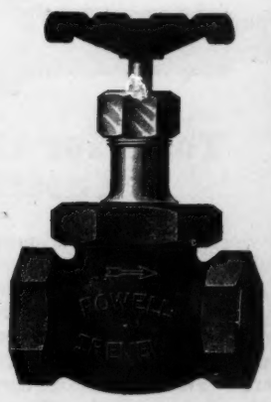

FIG. 190
IRON BODY GLOBE VALVE

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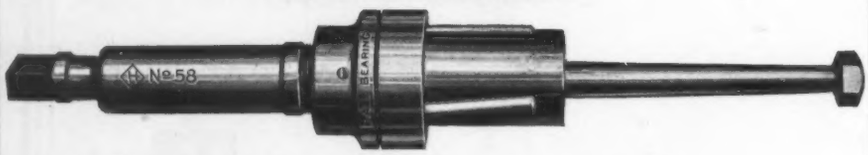

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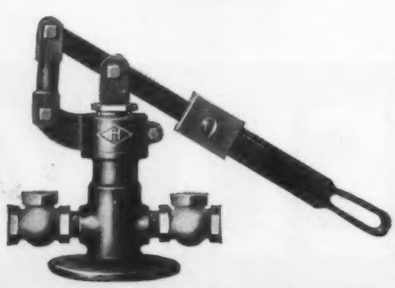
Tube Expanders for Pipe Work
Screw Punches for Plate Work
Flaring Tools for Still Tubes
Beading Tools for Still Tubes
Hydraulic Jacks
Hydraulic Punches



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proves the product. Paraffin is present in colloidal solution. The quantity increases with increase in softening point. Methods of determination of wax in bitumen are described and compared. Results by the alcohol-ether-bleaching earth extraction method of Suida and Kampther and by the distillation method differ as much as 40%. It is concluded that Holde's method is the most satisfactory.

Properties and Preparation of Bitumen Emulsions. W. GEISSLER, *Bitumen* **2** (1932) pp. 66-71.

The advantages of these emulsions in road construction are stated. The particle size of the dispersed bitumen varies from 0.1$_u$ to 10$_u$ with a few larger and smaller. The smaller the particles the more stable the emulsion. These emulsions must be stable in storage and transport, but labile or unstable when mixed with stone. After separation, water soluble emulsifiers remain in the water and solid emulsifiers adhere to the bitumen. The breakdown of the emulsion on stone is attributed to the adsorption of free alkali and soap by the stone thus disturbing the equilibrium in the contact zone. Emulsions containing solid emulsifiers break down by evaporation of the water. For surface treatment in wet weather a quick-breaking emulsion is required. Emulsions for use in mixtures should break slowly. Bituminous emulsions can compete with fluxed asphalts for surfacing and are definitely superior for the "penetration" process. In the mixture process fluxed asphalts are satisfactory. Methods of preparation of emulsions are described. The emulsifier is about 1% based on the finished emulsion. Each bitumen has an optimum temperature and emulsifier contact. Machines for making emulsions are described. An homogenizer is described.

Development of Polar Characteristics in Insulating Oils. W. N. STOOPS, *Physics* **2** (1932) pp. 322-8.

Measurement of the dielectric constant can be used to follow the deterioration of transformer oils in service. The change in polar characteristics correlates definitely with chemical change, and the change in the dielectric constant results from the formation of polar molecules. The method is accurate enough to distinguish between oils.

Lubrication of Diesel Engines. H. J. NICHOLSON, *Marine Eng.* **55** (1932) pp. 183-88.

Modern practice is the use of a full forced feed system of lubrication for bearings and mechanical lubricator for cylinders. The oil applied to the piston must reduce wear and assist in sealing piston rings. An effective seal cannot be maintained without oil. The high compression pressure (400 to 550 lb./sq. in.) tends to squeeze the oil from between rings and cylinder wall. The oil used must be one that forms minimum carbon when the thin film left on the cylinder wall is burned during the power stroke. A too viscous oil will not spread over the surfaces at the lower end of the lines. Too light an oil will not maintain a film at the high temperature of operation. Details of the method of lubricating 4-stroke and 2-stroke engines are given. Cutting oil grooves in bearings is often detrimental on account of reduction of effective bearing area. Cooling of the piston is best done by oil. The impurities that may contaminate an oil and their removal in the oil recovery process are discussed.

Film Lubrication of Journal Bearings. R. O. BOSWALL, *Engineering* **133** (1932) p. 527.

A detailed theoretical and experimental study of the phenomena of lubrication of journal bear-

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ings. It is concluded that for satisfactory lubrication: (1) The journal must be capable of establishing itself in a position such that (a) the resultant film pressure is equal to the load and (b) the lines of action of load and resultant film pressure must coincide, (2) The value of the criterion ZN/P should exceed unity and should preferably be over two, (3) With low values of ZN/P and small arcs of contact the film thickness is small and unusual care must be taken in securing perfection of the mechanical finish of the bearing surfaces, (4) Bearings should be so designed that the effective film length does not exceed 105° in the case of clearance brasses and 60° for bedded brasses, (5) The conditions of operation are improved and formation of a thick film promoted by eccentric loading and provision of chamfered inlet and outlet passages. The results apply strictly only to bearings with unrestricted vertical freedom.

Is the Loss of Viscosity in Lubricating Oil by Dilution a Criterion of Lubricating Power? M. ROEGIERS, *Angew. Chem.* **45** (1932) pp. 320-23.

The author criticizes the claim of Tausz and Staab that when a lubricating oil is diluted with toluene the less the loss of viscosity the greater is the original lubricating value. A relationship is found, however, between T and S's results and the slope of the viscosity-temperature curve. This does not apply to compounded oils containing animal or vegetable oils.

Estimation of Asphalt and Solid Impurities in Oils. K. P. MULLER, *Erdol und Teer* **8** (1932) pp. 235-7.

The crucible of Woog and Giraudon is described. It is a sintered Jena glass crucible containing a layer of 4g. of glass powder that passes a 0.058 mm. sieve. This powder will retain traces of asphalt but is non-absorbent. The crucible is washed with benzol and normal benzine and dried 30 min. at 105°C. 10g. of oil are dissolved in 40 ml. normal benzine and poured carefully through the crucible. The crucible is weighed after washing with benzine and drying. The asphalt in the powder is later removed with benzol. The method gives higher results than the Richtlinien method.

Some Analytical Reactions of Alkyl Mercaptans in Benzene Solution. J. R. SAMPEY AND E. E. REID, *Jour. Am. Chem. Soc.* **54** (1932) pp. 3404-9.

The iodometric method of estimating mercaptans was applied to solutions of these substances in benzene. Two acidimetric methods are given, one in which the hydroiodic acid formed in the iodimetric oxidation is tritrated, and one in which hydrochloric acid liberated by the action of mercuric chloride on the mercaptan is estimated.

The Principles of Colorimetry and Practical Color Measurement. J. W. PERRY, *Farben-Chemic* **3** (1932) pp. 125-9.

The requirements of colorimeters are stated in general and the guild instrument and its use are described in particular.

Colorimetry of Lubricating Oils. HERBRICH, *Ann. Chim. Analyt.* **14** (1932) (ii) pp. 193-201.

The Dubuscq colorimeter is regarded as unsatisfactory because the colors of oils can only be compared with each other. The Lovibond tintometer is unsatisfactory because the color glasses bear no algebraic relation to each other. However, a holder for Lovibond glasses can be placed under one of the plungers of a Dubosq instrument and the depth of oil equivalent to the glasses determined.

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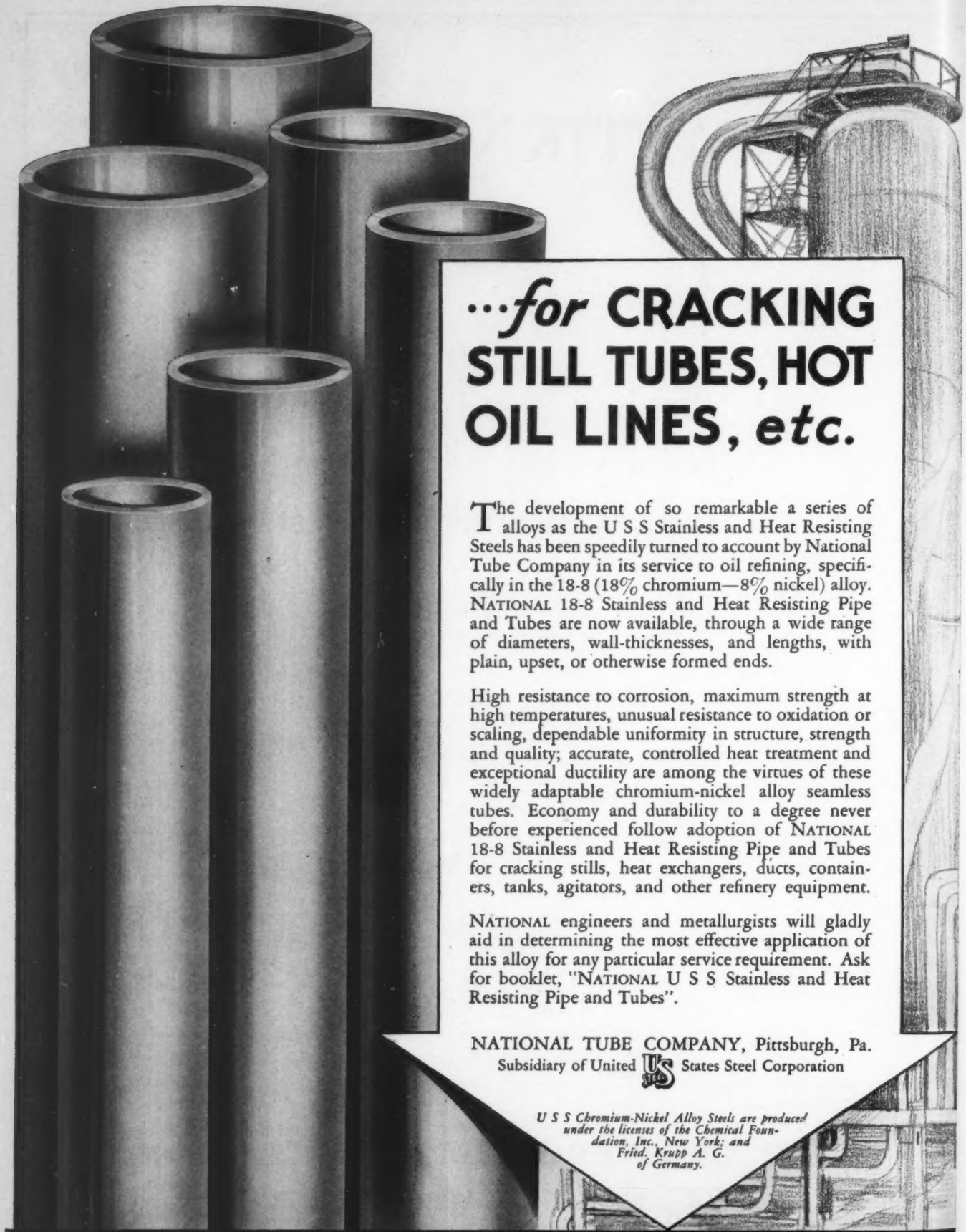

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THE MONTH IN REVIEW

Lyons Heads N. P. A. For Sixth Time

E. M. LYONS, president, Tiona Refining Company was re-elected president of the National Petroleum Association at its thirtieth annual meeting at Atlantic City, last month. This is Mr. Lyon's sixth term as head of the association. Charles L. Suhr, Pennzoil Company, was elected first vice president, filling the vacancy left by the death of Phil. Tarbox.

N. H. Weber, Pure Oil Company, was re-elected second vice president, and G. B. Hunter, Emlenton Refining Company, was re-elected treasurer. Fayette B. Dow, general counsel, announced promotion of Willis Crane to assistant general counsel. Mr. Crane was formerly traffic attorney for the association and a new traffic attorney will be selected.

Three vacancies in the board of trustees were filled by the election of H. M. Carruth, Canfield Oil Company, A. F. Carter, Shell Eastern Petroleum Products Company; and John A. Beck, Pennsylvania Refining Company. All other members of the board were re-elected as follows:

Sheldon Clark, Sinclair Refining Company; Earle M. Craig, Freedom Oil Works Company; G. C. Davison, Tri-State Refining Company; Frank B. Fretter, National Refining Company; W. V. Hartman, Gulf Refining Company; W. T. Holliday, Standard Oil Company of Ohio; O. P. Keeney, Wolverine-Empire Refining Company; Otto Koch, Kendall Refining Company; C. J. Leroux, Valvoline Oil Company; H. A. Logan, United Refining Company; E. M. Lyons, Tiona Refining Company; O. D. Robinson, Republic Oil Refining Company; A. W. Scott, Wolverine-Empire Refining Company; C. G. Sheffield, Standard Oil Company of New Jersey; C. L. Suhr, Pennzoil Company; N. H. Weber, Pure Oil Company; A. C. Woodman, Richfield Oil Company of New York; and R. A. Wotowitch, Crew-Levick Company.

Fourth Cracking Development Conference

THE fourth semi-annual meeting of the Cracking Development Conference was held September 14 to 17 at Hotel Commodore, New York. The objective of this conference is to correlate experimental and plant development work in pyrolitic cracking which is carried on in the laboratories of and refineries of The Texas Company, Standard Oil Company (Indiana), Gasoline Products Company and M. W. Kellogg Company. Previous conferences have been held in Los Angeles, Whiting, Indiana, and Port Arthur, Texas.

The conference serves as a clearing house for improvements in processing methods, and acts as a committee on standards used in the design of cracking equipment. Such improvements are then incorporated by M. W. Kellogg Company, as engineering and licensing agents, in designs for new cracking installations and for remodeling present cracking equipment of licensees of Gasoline Products Company (licensing Cross, deFlorez, Holmes-Manley, Tube & Tank and Combination processes).

Personnel of the recent conference included research workers, development engineers, and refinery operators, as well as representatives of the administrative departments. Principal topics listed for consideration at this meeting included the following: a review of cracking operations over the past six months, including operating data on cracking units recently installed; stabilization of pressure distillates; designs of heaters for cracking installations; review of the developments in experimental cracking projects in laboratories of the three groups during the past six months; anti-knock properties of gasolines produced by cracking; physical properties and behavior of hydrocarbon mixtures; process design, including discussion of time and temperature effects on coil and drum cracking; mechanical design, including pressure drops through gas, vapor, and oil lines, safety valve requirements, and review of physical data on steels and alloys; lining of pressure vessels; and sub-committees' reports on rectification and tubing specifications.

Production of Natural Gasoline Declined in 1931

PRODUCTION of natural gasoline in 1931 declined 17 per cent in volume and 42 per cent in value. Total production was 1,831,918,000 gallons, valued at $68,732,000. The decrease in output is attributed to material decline in crude oil production; the decrease in value was a reflection of low prices for motor fuel, according to G. R. Hopkins, U. S. Bureau of Mines, Mineral Market Report No. 149.

Both the number of operating plants and the number of operators have declined during the period 1929-1931. Plants decreased from 1119 in 1929 to 937 in 1931. Operators decreased from 394 to 324 during the same period. At the same time, Bureau of Mines Information Circular 6635, "Natural Gasoline Plants in the United States," show an eight per cent increase in total capacity between January 1, 1930, and January 1, 1931—this condition resulting from the fact that marginal plants dropping out were of small capacity, whereas the new plants, although few in number, were of large capacity.

California continued to hold first place in gasoline production, with Oklahoma and Texas, second and third, respectively. These three states produced 85 per cent of the total output last year. Although still far ahead of the rest of the world in natural gasoline production, the United States suffered another small loss in relative importance in 1931. Thus, out of a total world output of 2,122,168,000 gallons in 1931, the United States produced 86.3 per cent; all other countries, 13.7 per cent. In 1927 these percentages were 94.2 and 5.8, respectively.

A. S. T. M. Annual Meeting Dates

AMERICAN Society for Testing Materials has announced that the 1933 Annual Meeting of the society will be held at the Stevens Hotel, Chicago, June 26-30, during the Century of Progress Exposition.

Water Mining Company Organized

WATER Mining Corporation has been organized under the laws of Delaware for the commercial production of water for industrial and municipal purposes using the Ranney method of liquid mining. Organizers of the new company which has offices at 26 Broadway, New York, and 702 Kennedy building, Tulsa, are Leo Ranney and Lynn C. Converse.

Mr. Ranney, some years ago in the Burkburnett field in North Texas, developed his liquid mining process under actual field conditions and later the patents covering the process were acquired by Standard Development Company, a subsidiary of Standard Oil Company of New Jersey, which organization still controls the basic rights.

Operating under an exclusive license from Standard Development Company, Water Mining Corporation has installed water mines for a number of industrial concerns, including oil companies, and the experimental work on perfecting the process has been carried on in both domestic and foreign fields over a period of more than 10 years. Carter Oil Company has a water mine commercially producing in the Seminole field in Oklahoma and this installation has been followed with much interest.

The Raney process is to sink a main shaft or caisson to the bed rock where

the water is sealed off, after which the underground water sources are tapped with auxiliary shafts or tunnels that extend across the line of flow. Where the water sand is not prolific these shafts or tunnels are extended below the water flow and from underneath the bedrock holes are drilled through the rock above and when properly screened these openings provide a water source. In such sands individual water wells likely would not produce in commercial quantities.

Though each installation usually presents an individual problem in obtaining a water supply, depending on the nature of the country and the requirements to be met, the plan of Water Mining Corporation is to provide water in sufficient quantities in fields where the supply is scarce and with gathering and distributing lines to loop the field and sell water on a uniform basis.

Lynn C. Converse, vice president and general manager of the new company, has been a resident of Tulsa for more than 10 years and is the head of Lynn C. Converse Company, a refinery contracting business.

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Carbon Black Output Declining

THE history of the carbon black industry in 1931 was one of declining production and uniform demand, but materially lower prices, states G. R. Hopkins and H. Backus, in Carbon Black in 1931, Bureau of Mines (Mineral Resources of the United States, 1931, part II, Pages 33-34, available from the Superintendent of Documents, Washington, five cents). The center of the industry became more firmly established in Texas, as the output of that state was 75 per cent of the nation's total in 1931.

The number of operators declined to 26 and the number of plants to 58 during 1931, and total capacity amounted to 1,366,975 pounds daily, as compared to 1,481,175 pounds in 1930. Total output for the year amounted to 280,907,000 pounds, which was 26 per cent below 1930 and represented the first annual decrease since 1925.

The bulletin presents a summary, a discussion of production by states and districts, consumption, number and capacity of plants, a list of producers of carbon black, and discussions of prices and values, foreign trade, and the carbon black association.

Burrell's Book On Russia

"AN American Engineer Looks at Russia," by Col. George A. Burrell, (The Stratford Company, Boston, Mass., $2.50), is an interesting story of the conditions in Russia before and since the World War. Col. Burrell spent 18 months in Russia modernizing part of that country's petroleum industry.

In this book which convincingly covers the subject, the author gives first hand reports of Communism, with its hold on 165,000,000 Russian inhabitants; authentic reports of the dreaded espionage; poor housing facilities, lack of materials of every sort, government cooperative stores, influence of the trade unions, collectivization of the peasant farms; what the Communistic Party is slowly accomplishing through education of the people; Stalin's rise to power after escaping from prison many times. The Five-Year Plan of Soviet Russia is explained and exposed in all its intricate maneuverings. The present status of Soviet Russia, how it is affecting the rest of the world, and the menace of Communism in the United States, summarizes this book of plain and enlightening facts.

Col. Burrell neither went to Russia nor came out a Bolshevist, and feels that matters are not all bad, or all good.

R. R. OWENS

Owens Long Experienced Gasoline Industry

R. R. (DICK) OWENS became interested in the natural gasoline business through working with Hope Engineering & Construction Company, with whom he was associated for several years. Later he was in charge of gasoline plants for the old Marland Oil Company, then worked with Gilmore Gasoline Company, in charge of construction. During recent years he has been associated with Cromwell-Franklin and Wirt Franklin et al in the natural gasoline department, supervising construction and operation of Oklahoma City field plants. Two plants are being operated in this field by his company, being combination gasoline and gas-lift installations.

A. R. LOVE

Sellars is Skelly Ten-Year Man

A. I. SELLARS, general field superintendent for Skelly Oil Company in the natural gasoline department, and a "ten-year man," began working with the company "at first one job, then another." Gathering charts, oiler, stillman, engineer, and others, seeing service in several company plants in Central Oklahoma and North Texas, then placed in charge of plant operations. As changes occurred in the organization he was made general field superintendent in charge of operation of all plants in North Texas, Texas Panhandle and Oklahoma. There are several short-cuts, economies and time and labor-saving devices for which he is given credit.

A. I. SELLARS

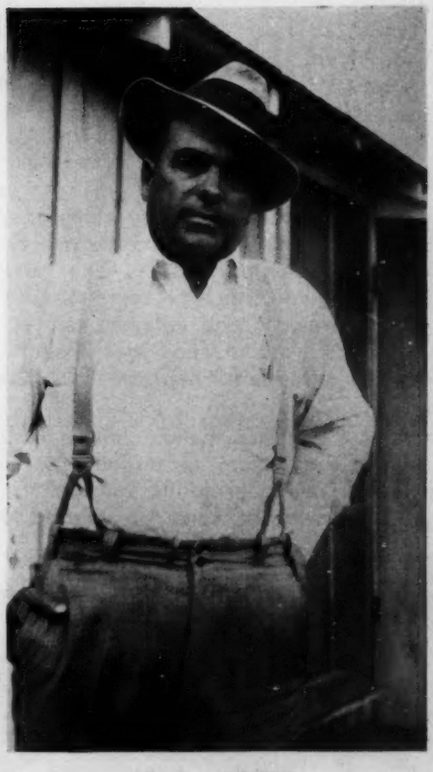
Love Started on the Yard at Duncan

AFTER serving six years with one company as stillman, A. R. Love, formerly of the Wichita Falls refining district, decided to look about for something better. He drove to Duncan, Oklahoma, convinced the Rock Island Refining Company that he was not looking for a position, but a job. They gave him a "canal wrench"; he took it. A few days in the ditch and he was given a connection crew. A few weeks of that, several other promotions—and then night superintendent of the refinery. Which comes through "getting things done."

O. H. KESSINGER, formerly refinery superintendent, Continental Oil Company, Pyote, Texas, has been transferred to Ponca City refinery as night superintendent, replacing Walter Miller, Jr., who was transferred to the lubricating oil department.

Green is Pioneer Plant Operator

J. O. GREEN, Seminole district superintendent for Barnsdall Oil Company, gasoline department, began working in the natural gasoline industry in 1913 with Pulaski Oil Company at the Turkey Mountain (near Tulsa) gasoline plant. After several years he went with Waite Phillips Company in the gasoline department (1923) to be transferred soon to the refining department as lubrication engineer. This work took him to all company plants in the Mid-Continent area digging out troubles in lubrication. When the company was sold to Barnsdall Corporation he remained with the organization, was transferred back to the gasoline department, and the Seminole boom found him in charge of several gasoline plants in that district.



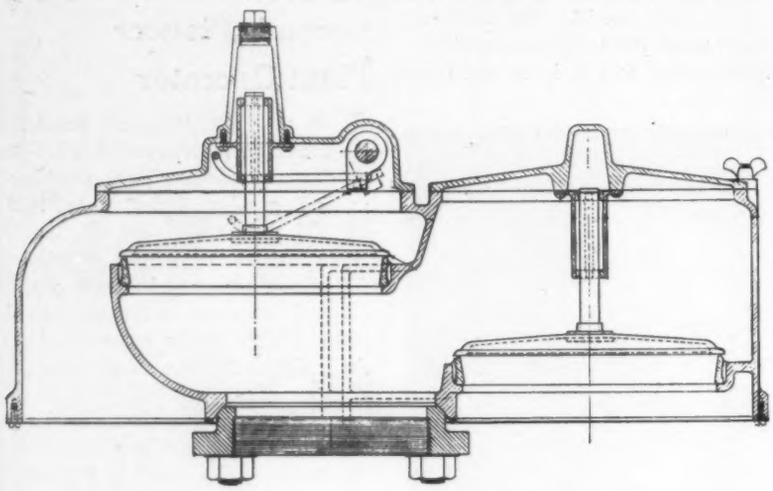
J. O. GREEN

PLANT ACTIVITIES

Resumes: Atlantic & Pacific Oil Refining Company, Wichita Falls (formerly Orient Refining Company) has resumed operations at about one-third capacity.

Cracking: Les Raffineries de la Vacuum Oil Company, S. A. F., Frontignan, France, and Compagnie Industrielle de Petrole, S. A. F., at Port Jerome, France, have let contract to M. W. Kellogg Company for construction of two combination primary cracking, vapor phase cracking, and reforming units, with stabilizer and rerun still, under Gasoline Products Company-Socony-Vacuum Corporation license. Capacity 2700 barrels each.

Acquisition: Standard Oil Company (Indiana) and Stanolind Oil & Gas Company, at stockholders meeting, October 27 will propose sale of assets of Midwest Refining Company to the parent organization, now owning 99.96 per cent of the Midwest stock. Stanolind Oil & Gas Company, producing subsidiary of the Indiana Standard, will take over producing and pipe line properties. Standard of Indiana will take over refineries at Casper, Greybull and Laramie, Wyoming. T. A. Dines, chairman of the board for Midwest and president of Utah Oil & Refining Co., (subsidiary of the Midwest) will become vice president of Standard Oil Company (Indiana).



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Refinery: Gulf Refining Company, building 15,000-barrel refinery Staten Island, New York, across the river from the Bayonne refinery, cost $800,000.

Cracking: Standard Oil Company (Indiana), is progressing with construction of cracking units at Casper and Greybull, Wyoming refineries.

Refinery: The Lake Refinery Company, nearing completion of 500-barrel skimming plant south part of Gladewater, Texas (East Texas field), townsite. Organized by R. B. Harris, John Kraker, Chas. Triger and Rudman.

Refinery: The Cooper-Potter Refining Company, constructing 250-barrel skimming plant, Kilgore, Texas, East Texas field.

Rebuild Refinery: Gladewater Refining Company, Gladewater, Texas, in the East Texas field, swept by fire late in September will rebuild the refinery at once. Capacity 1000 barrels, estimated cost $50,000.

Stabilizer: Union Oil Company of California, Wilmington plant, to build new pressure distillate stabilizing plant, report cost $115,000.

Cracking: General Petroleum Corporation of California, making additions to Torrance refinery through moving tanks, distilling equipment from Vernon plant, and a new cracking plant is under construction. Cost of changes reported about $1,000,000.

Cracking: Red Ball Refining Company organized by Joseph and Jack Danciger and associates will install 3000-barrel cracking plant on adjacent site to same owner's Petroleum Refractionating Corporation, 6000-barrel skimming plant at Pampa, Texas. General offices, W. T. Waggoner Bldg., Fort Worth.

Operating: Mertzon Refining Company has started operating 200-barrel skimming plant at Mertzon, Texas. W. O. Stowell, former superintendent natural gasoline plants for Humble Oil & Refining Company, organized and in active charge. Santa Fe Railroad.

Operating: Tren-Tex. Refining Company, Trent, Texas, organized by R. O. and Nat Anderson, Merkle, Texas, is operating 200-barrel plant at Trent, Texas. Noodle Creek field crude, Jones County, Texas and Pacific Railroad. (Refiner, Sept. 1932, page 52 A).

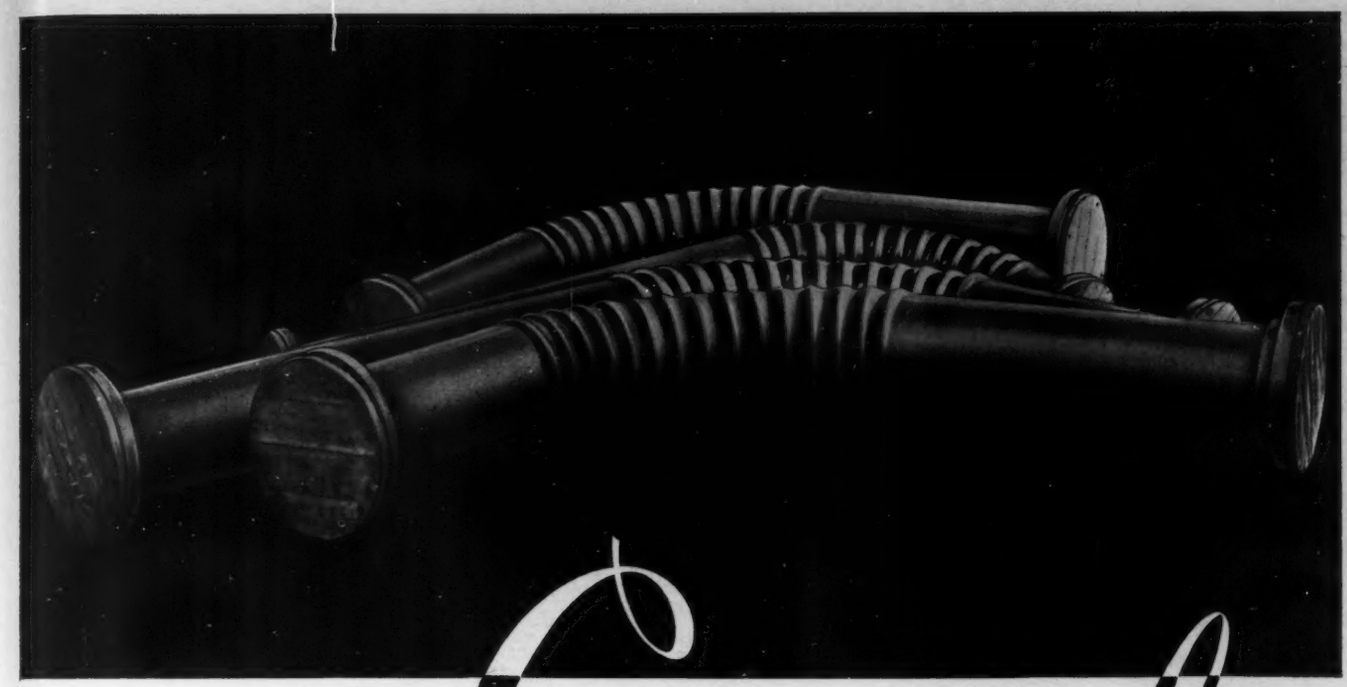
Cracking: Mid-Continent Petroleum Corporation at West Tulsa, Oklahoma, refinery reported planning construction of addition cracking units.

Cracking: Continental Oil Company, Ponca City, Oklahoma, is reported planning increase in cracking facilities at the Ponca City refinery.

Refinery: Lake Refining Company, Gladewater, (East Texas field) Texas, is building a 500-barrel skimming plant. Organized by Chas. Triger, John Kraker, Rudman, et al.

Acquisition: Alamo Refining Company has taken over the plant of Slack Petroleum Company for operation. Plant at Willow Springs, near Longview, Texas, rated at 2500 barrels daily. Alamo Refining Company was organized by G. L. Rowsey and C. Wilbur Cahoon, Jr., both officers of Taylor Refining Company, and J. G. Pundt.

Stabilization: Empire Oil & Refining Company, Ponca City plant, building gasoline recovery and stabilizing system, contract to Black, Sivalls & Bryson, Inc., to handle 5,000,-



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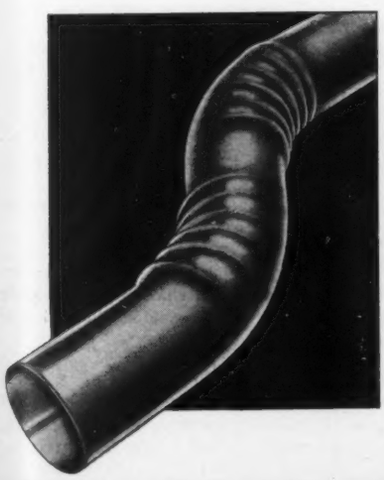

Where greater flexibility is desired, Pittsburgh Piping Creased Bends are installed to provide the necessary expansion and contraction. Since these bends are more flexible than plain pipe bends, stresses on adjoining connections and equipment are materially reduced.

These bends are made on very short radii—usually only 2 to 2½ times the nominal pipe diameter—so, where space is limited, the use of Creased Bends is very advantageous.

Write today for Bulletin B-201, which contains detailed information and design data on both Creased and plain bends.

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P&E Co.

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000 cubic feet gas. Company recently completed erection of modern reforming unit at this refinery.

Cracking: Consolidated Oil Corporation will soon look into plans for adding cracking facilities at the El Paso, Texas, refinery of Rio Grande Oil Company, according to reports from El Paso, following acquisition by the Sinclair concern.

Operating: Midland Oil Refining Company, Adams County, Colorado, near Denver, has started operating new refinery following completion insulation work by Johns-Manville Company.

Completed: Standard Oil Company of California, completed construction of absorption gasoline plant, Middle Dome, Kettleman Hills field, California, capacity 50,000,000 cubic feet daily.

Stabilizing Unit: Gilmore Gasoline Company, Long Beach plant, Signal Hill field, California, is adding stabilization system, plant No. 1, contract to C. F. Braun & Company.

Stabilizing Unit: Gilmore-Dabney Gasoline Corporation, Long Beach, California, plant No. 3 is adding stabilization system, contract to C. F. Braun & Company.

Gasoline Plant: Compania Mexicana de Gas, S. A., was granted concession to install natural gasoline plant, Monterrey, Nuevo Leon, Mexico, capacity 700,000 cubic meters.

Rebuild: H. Foster & Co., Ltd., Leeds, England, plans to rebuild oil refinery including distallation and condensing equipment. Estimated cost $100,000.

Acquisition: Consolidated Oil Corporation is again reported negotiating for acquisition of Tide Water-Associated Oil Company, reviving merger talk of about a year ago.

Merger: Rio Grande Oil Company stockholders ratified the proposed merger of that company with Consolidated Oil Corporation, at a meeting of stockholders during the middle of September.

Merger: Standard Oil Company of New Jersey, Standard Oil Company of California, Standard Oil Company of Ohio and Standard Oil Company of Kentucky, according to reports in New York financial circles, are working on a merger plan, to involve the New Jersey concern taking over the Ohio and Kentucky companies before merging with the California Standard.

Acquisition: Valley Consumers Oil Company has taken over the Peterson-Woodruff refinery at Harlingen, Texas, and will operate, capacity 500 barrels, skimming plant.

Acquisition: Niagra Oil Corporation, Bradford, Pennsylvania, purchased refinery of Viking Oil Corporation, shut down, 2500 barrels capacity, Clarenden, Pennsylvania, at sheriff's sale, $53,000. Forrest E. Dorn (Forrest Oil Corporation) is to be president and A. D. David, one time manager of refineries for Continental Oil Company, to be vice president and general manager of subsidiary company to be formed.

Purchase: George K. Hambleton has made a deposit toward the purchase of the Swann-Finch refinery, Warren, Pennsylvania, (formerly Seneca Oil Works), 1000 barrels capacity. If purchase complete Hambleton plans extensive improvements, including installation of cracking facilities.

Cracking Units: Phillips Petroleum Company at Borger, Texas plant, installing 5,000-barrel, company owned, cracking unit, to be completed January, 1933. Design follows large scale experimental reforming installation at the company's Kansas City refinery, developed under direction of M. P. Youker, who heads refining department. (Refiner, August, 1932, page 54A and April, 1932, page 76A).

Sale: Raffinerie Nationale de Petroles refinery near Ghent, Belgium, will be offered at public sale October 14, in the Grande Palais de Justice in Ghent; modern distillation equipment, 1000-barrel Jenkins cracking unit.

Construction: Shell Petroleum Corporation, Houston, adding modern coke tipple extending loading docks, adding three 118,000-barrel steel tanks.

Construction: Wolverine Empire Refining Company, Reno, Pennsylvania, has completed addition of steam generating equipment, stoking system and automatic fuel conveyor system.

Cracking: Phoenix Refining Company, San Antonio, Texas, after purchase of 1000 barrel skimming plant of Crescent Oil & Refining Company, Houston, has been negotiating for nearby site on which to erect cracking facilities.

Construction: Black Gold Refining Company, Oklahoma City, has completed construction of high pressure distillation equipment. Contract, Leader Iron Works.

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Harrisburg couplings, pump liners and flanges have come to be recognized as "the standard" because they were the first to introduce precision and uniformity . . . Every thread in these Harrisburg-made products is of uniform fullness, height, angle and gauging . . . . While the oil industry was one of the first to adopt Harrisburg seamless steel and forged fittings, engineers in every industry are now specifying them. For Harrisburg has shown how essential a perfect thread is to a perfect joint.

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New Equipment for the Modern Plant

1. Humidigraph

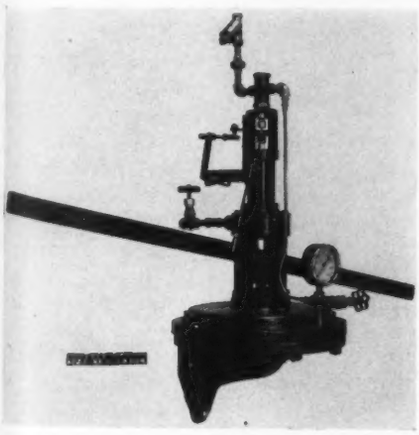
THE BRISTOL COMPANY

The Bristol Company, Waterbury, Connecticutt, has announced a new addition to its line of instruments known as the Bristol Humidigraph. The models made direct readings possible, eliminating the use of reference tables, calculations etc. The instruments in one model records the relative humidity and a combination instrument is available with two pens marking the same chart; one recording the relative humidity, the other the temperature. The humidigraph is available in a round case using four- and eight-inch charts and may be secured in portable form or for surface mounting at a permanent location.

2. Regulator

MOREY & JONES, LTD.

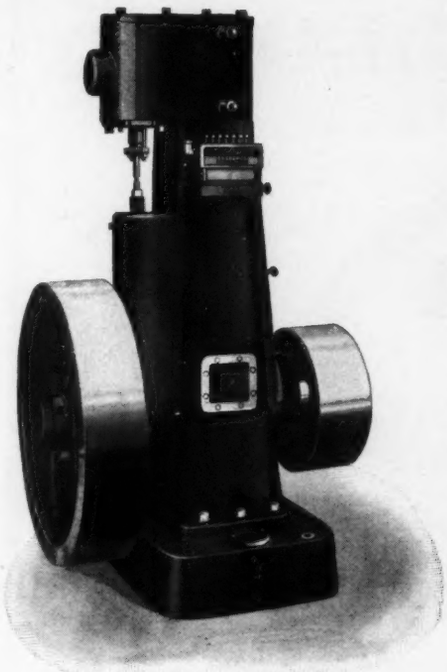
Morey & Jones, Limited, 922 South Hemlock Street, Los Angeles, California, have just developed a new "Type EK" regulator, which is designed to automatically adjust the fuel valves and dampers on steam boilers, of either the gas or oil fired type, in direct relation to steam pressure changes during change of loads.



Morey & Jones Regulator

A pilot valve spring is set to balance the desired boiler pressure which is exerted onto a diaphragm. As the pressure goes above the set point, minutely, steam from the header or some other constant-pressure fluid is admitted to exert pressure on the main regulator diaphragm. When this diaphragm moves, a special automatic compensating device acts to avoid "over-travelling" or "hunting," preventing further movement until it is required by further change in the pressure conditions or a reversed action is demanded.

These regulators are suited to the handling of steam pressure ranging from two to 350 pounds per square inch. The regulator arm movement may be varied over a wide range to suit various control conditions and mechanical movement needed.



Troy Vertical Steam Engine

3. Vertical Steam Engine

TROY ENGINE & MACHINE CO.

Troy Engine & Machine Company, Troy, Pennsylvania, announces several major improvements in the Troy-Engberg Type E engines, prominent among which is a new watershed partition between the cylinder and crankcase.

No part of the partition comes in contact with the piston rod. This partition, moreover, with special drains from piston rod and valve stem stuffing boxes, prevents practically all of the water from the cylinder from getting into the oil reservoir, thereby minimizing emulsification of lubricant. The watershed partition also prevents lubricating oil from following the piston rod to the top of the watershed, where it would escape into the drain.

Type E engines are available with either flat or piston valve, the flat valve being preferable in installations in refineries where there are considerable quantities of water that might cause difficulty with the piston valve type. The latter type, however, is considered more efficient for operation on high pressure, superheated steam that is inclined to be free from water.

These engines are heavy duty engines with large bearings. They are fully inclosed, self oiling, of wide speed range, high starting torque, and, according to the manufacturer, have a very low maintained steam rate.

4. Hoist Motors

GENERAL ELECTRIC COMPANY

General Electric Company, Schenectady, New York, announces Type KR, totally inclosed hoist motors with high starting torque and high slip, manufactured in sizes ranging from 1½ to 15 horsepower.

Type KR motors, according to the manufacturers, are designed particularly for application to cranes and hoists of the smaller sizes; they have high resistance rotors, maximum torque occurrring at about 10 per cent speed.

The stators are of riveted construction; end frames are die-formed from heavy steel plate; punchings are stacked between end frames and held by soft steel rivets.

5. Low Pressure Hot Oil and Reflux Pump

INGERSOLL-RAND COMPANY

Ingersoll-Rand Company, 11 Broadway, New York, New York, announces Type BJV low pressure, hot oil and reflux pump for handling hot distillates, hot oil transfer, bubble tower reflux, still bottoms, etc., about the cracking plant; and for

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propane, butane, fat and lean absorption oils in the stabilizing or absorption plant.

The design is such that the casings may be made of cast iron, steel or special alloys to suit particular conditions to which the pump is adapted.

There are extra large areas both of suction opening and impeller eyes. This assures a low inlet velocity so that hot or cold liquids of relatively high vapor pressures can be handled with a minimum head above the center of the unit.

The suction is vented to prevent the collection of vapors at impeller eyes.

Horizontally split casing has been found desirable for reasons of accessibility and much preferred to the barrel type casing for medium or low pressure work.

These units are designed in sizes suitable for a range of capacities from 25 to 1000 gallons per minute and for maximum heads of 650 feet at 3600 revolutions per minute, 750°F. maximum temperature.

6. Activated Carbon

SOCIETE DE RECHERCHES ET D'EXPLOITATIONS PETROLIFERES

Societe de Recherches et d'Exploitations Petroliferes, 11 Bis Avenue Victor Hugo, Paris, 16, France, announces perfection of activated carbons, registered under the trade name "Acticarbone." Plants or processes are offered for extraction of gasoline, benzol extraction, vapor recovery, recovery of alcohol vapors, ether vapors, solvent naphthas, animal fats solvents, organic solvents, for deodorizing, for concentration and purification of gases, for drying air or gases, and other recovery and purification problems. The company has a number of descriptive bulletins of interest, such as Trade Notices Nos. 10, 11, 14 and 16, descriptive of the activated carbons, their manufacture, and their utilization, which are ready for distribution to those interested.

7. Thermo-Regulator

HIERGESELL BROTHERS

Hiergesell Brothers, 2504 North Broad Street, Philadelphia, Pennsylvania, announce a new "Red Top" thermo-regulator, a precision temperature control device for maintaining pressures within one-tenth of a degree of the setting. According to the manufacturers, the device was designed particularly for chemical and oil laboratories.

Some features of the thermo-regulator are: the mercury is purified through a special process; the capillary and reservoir is filled with dry hydrogen to dampen the spark at the contact point; the electrodes are designed to contact on top of mercury; there are terminals for connecting the control circuit; relays operate within 12 milliamperes at 110 volts, 60 cycles; and the relay contacts will carry loads up to 30 amperes at 110 volts alternating current.

Thermo Regulator

METALLO

STYLE 1000

For high pressures and extreme conditions, Metallo Style 1000 double jacket metal-asbestos gaskets are preferred by many engineers on flanged joints under steam, air, water and other pressures. Style 1000 gaskets are made in various metals, including copper, to meet special service requirements. For hot oil pump service, as an instance, Metallo Style 4 steel asbestos filled gaskets are recommended.

Whatever your gasket requirements may be around the refinery, there is a proper Metallo Gasket to meet your most exacting needs. Many of the world's largest users of gaskets standardize on Metallo, positive assurance that quality is right.

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have been used for steam boilers for 25 years and are now being used by leading oil companies for indicating oil levels in tanks, towers, stills, etc.

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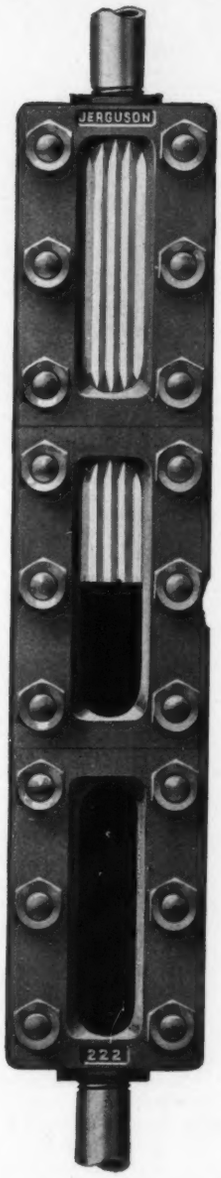

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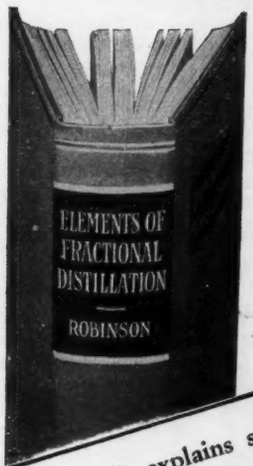

Elements of Fractional Distillation

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Assistant Professor of Chemical Engineering, Massachusetts' Institute of Technology

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This book explains simply and accurately, according to the best ideas of physical chemistry and chemical engineering, the principles of fractional distillation, illustrating these principles with carefully selected applications.

204 pages
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ITEMS ABOUT MANUFACTURERS

Kieley & Mueller, Incorporated, New York, New York, has appointed F. G. Hartley Company, Perkins Building, Tacoma, Washington, agent for its line of pressure control devices and allied specialties in the Pacific Northwest.

D. W. McLenegan has been appointed assistant engineer of the commercial engineering division of the General Electric Company air conditioning department, it was recently announced by J. J. Donovan of New York, manager of the department. Mr. McLenegan is a native of Milwaukee and a graduate of the University of Wisconsin in mechanical engineering with the class of 1921.

A. W. Burkett, sales engineer, southwest territory for Alco Products, Inc., Tulsa, Oklahoma, has resigned, effective September 1, and is moving to Los Angeles. It is reported that he and H. S. Houghton, formerly of Jackson Engineering Company, will form Security Service Corporation of California, with headquarters in Los Angeles.

Donnelly Process Corporation, 844 Rush Street, Chicago, announces appointment of the Southwestern Engineering Corporation of Los Angeles, Tulsa and Philadelphia, as exclusive representatives in the United States to engineer, manufacture, sell and erect cracking units to be operated under license from Donnelly Process Corporation.

Ingersoll-Rand Company was host September 14 at its Cameron plant to 32 refinery engineers and technicians, for whose observation the above attractive display was arranged to show the guests pumps for all refinery services, to explain the details of construction of these pumps and to elicit from the guests practical recommendations for possible improvement in design and construction

Elliott Company, Pittsburgh, Pennsylvania, and associates, The Lagonda Manufacturing Company and Liberty Manufacturing Company announce the removal of their Baltimore District office to Washington, D. C. The new address is 918 Washington Loan and Trust Building. H. C. Hale is district manager. Mr. C. H. Russell remains in Baltimore at 3602 Calloway Avenue, as resident sales engineer.

F. J. Rudd has been appointed managing engineer of the motor department of the General Electric Company. He succeeds L. E. Underwood, who has been made manager of the Pittsfield, Massachusetts, works of the company.

Me-Terj-ol Products, Incorporated, New York, N. Y., announces organization of Me-Terj-ol Sales Company, Burt Building, Dallas, Texas, with sales and distribution of the company's products in Texas, Oklahoma, Louisiana, Arkansas, California, Kansas, New Mexico, Arizona and Mexico under direction of Reeves M. Lane and Al Josephson.

The Me-Terj-ol organization specializes in the manufacture of detergents for cleaning painted surfaces, cement surfaces, metal surfaces, appliances for the reclamation of drums in which petroleum products have been contained and which have been damaged through rough usage.

Coppus Engineering Corporation, Worcester, Massachusetts, announces appointment of John B. Foley, Jr., 510 Hills Building, Syracuse, New York, as sales representative for that territory.

Universal Oil Products Company, owners of the Dubbs cracking process, has perfected a gum inhibitor in liquid form, which it offers to the trade as "Universal Inhibitor." Announcements state that one gallon of the inhibitor to 100 barrels of gasoline is the usual requirement, having been proved by the successful treating of millions of barrels of different cracked gasolines of various compositions and various gum forming tendencies. The inhibitor, perfected at the company's research laboratories at Riverside, Illinois, is now available to all refiners; Dubbs licensees can buy it at preferential low price. Use of the inhibitor is said to reduce costs in treating, avoid volumetric losses, preserves the anti-knock value of the gasoline and forestalls gum formation, making it possible to store gasoline for long periods without deterioration.

Roots-Connersville-Wilbraham, Connersville, Indiana, has arranged to manufacture the purging machine designed by A. D. Harrison, Brooklyn, N. Y., used by refiners to purge gas holders, mains, tanks, fractionation equipment, etc. The machine is built to produce inert gas containing less than one per cent oxygen and free from carbon monoxide, when operating on natural gas or manufactured gas. It has also been introduced in the utility field where gas companies employ it to purge gas holders, mains, etc.

The Lincoln Electric Company, Cleveland, Ohio, announces the appointment of G. E. Tenney as sales manager of the Chicago district.

Mr. Tenney, a graduate engineer from Ohio State University, interlarded his engineering work with four years' service on the Mexican border, the Philippines and the Orient with the United States Army.

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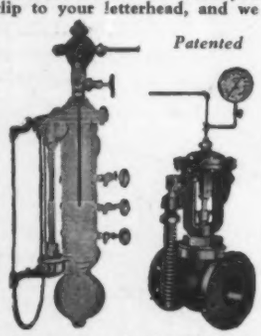

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- ☐ Temperature Regulators
- ☐ Pump Governors
- ☐ Float Valves
- ☐ Swing Joint Fittings
- ☐ Bronze Unions
- ☐ Thermostats
- ☐ Balanced Valves
- ☐ Control Valves

▼ CATALOGS . . . BULLETINS ▼

Helpful Publications Which Manufacturers Will Gladly Send Free for the Asking

Absolute Pressure Gauge

The Bristol Company, Waterbury, Conn., is distributing bulletin No. 1011 descriptive of its line of recording absolute pressure gauges, which are direct reading instruments recording absolute pressure in inches of mercury, for use in conjunction with vacuum distillation and other vacuum processes.

Centrifugal Pump

Morris Machine Works, Baldwinsville, N. Y., has announced in a new bulletin, the development of a new non-clogging centrifugal pump, an addition to its complete line of centrifugals for all purposes.

Hydrogenation Apparatus

American Instrument Company, 774 Girard St. N.W., Washington, D. C., has prepared Bulletin 1700 dealing with Aminco hydrogenation apparatus; a complete line of apparatus for hydrogenation at high pressures and temperatures on a laboratory scale. An assembly includes pressure autoclave, heating jacket, motor driven shaker, and all necessary high pressure fittings, gages, etc.

Refractory

Quigley Company, Inc., 56 West 45th St., New York, is distributing a bulletin describing "Cast-Refract," a castable refractory for forming special shapes, furnace door linings, monolithic combustion chambers and hearths and other useful applications in the furnace room. Dimension tables giving necessary details and prices are included.

Barrel Handlers

Schwenk Safety Device Corporation, 27 Water St., New York, discusses its safety barrel and drum handlers in an eight-page folder, illustrated, giving list of uses and prices.

Cracking Process

Lincoln Clark, 646 South Madison Avenue, Pasadena, California, owner, the Clark Vapor Phase Cracking Process, for producing 70 to 100 octane number motor fuel, has prepared complete information presenting details of the process, its operation, construction and costs.

Meters

National Meter Company, 299 Broadway, New York, N. Y., has issued Bulletin No. 126, superseding No. 125 and containing data of interest to the refiner and natural gasoline manufacturer.

Meters

The Pittsburgh Equitable Meter Company has recently issued a 16-page catalogue entitled, "Pittsburgh Oil and Gasoline Meters for Bulk Stations, Refineries, Tank Trucks and Pipe Lines." This bulletin describes and illustrates Pittsburgh Piston Meters, Pittsburgh Disc Meters and Eureka Current Type Meters.

Steel and Pipe

Youngstown Sheet & Tube Company, Youngstown, Ohio, has issued a 28-page, illustrated booklet listing briefly the many articles of its manufacture, such as all types of oil country tubular goods and line pipe, plates, structural steels, wire products, conduits, and other steel products.

Mixing Head

Martin Decker Development Company, 3431 Cherry Avenue, Long Beach, California, is distributing a pamphlet descriptive of the Master Mixer Head, which has been acquired by the company. The pamphlet gives detail drawings of the head, presents details of its construction and enumerates the applications of the mixer in the petroleum refining industry.

Copper Plated Gaskets

The M. W. Kellogg Company, 225 Broadway, New York, New York, has for distribution a four page, illustrated bulletin describing "Kell-Raph" copper plated gaskets for high pressure, high Temperature pipe joints.

Multi-stage Pumps

De Laval Steam Turbine Company, Trenton, New Jersey, has ready for distribution Catalog B-5, dealing with its complete line of multi-stage centrifugal pumps with single suction impellers. Pumps are described up to seven stages in one casing and four heads up to 1600 pounds per square inch. Special designs are discussed for handling high temperature fluids.

Flanges

Harrisburg Pipe and Pipe Bending Company, Harrisburg, Pennsylvania, has recently published for distribution a 32-page, illustrated catalog titled "Harrisburg Drop Forged Flange Facts," containing descriptions of low hub flanges, Van Stone flanges, slip-on flanges, butt welding flanges, blind flanges, and Ludlow flanges.

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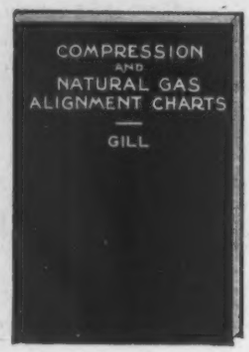
COMPRESSION AND NATURAL GAS ALIGNMENT CHARTS

By THOMAS T. GILL



The charts in this book have been found useful in solving field problems arising in connection with the measurement, compression and transmission of natural gas, and in the manufacture of natural or casinghead gas. As many of the formulas in common use in natural gas operations are of an impirical nature, with constants that must be evaluated under varying conditions, it will be found that alignment charts are sufficiently accurate for nearly all purposes except for metering large quantities of gas, and here they serve as an excellent check on other calculations. Contains 41 charts, 65 problems. Price $3.50 Postpaid.

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Advertisers' Index

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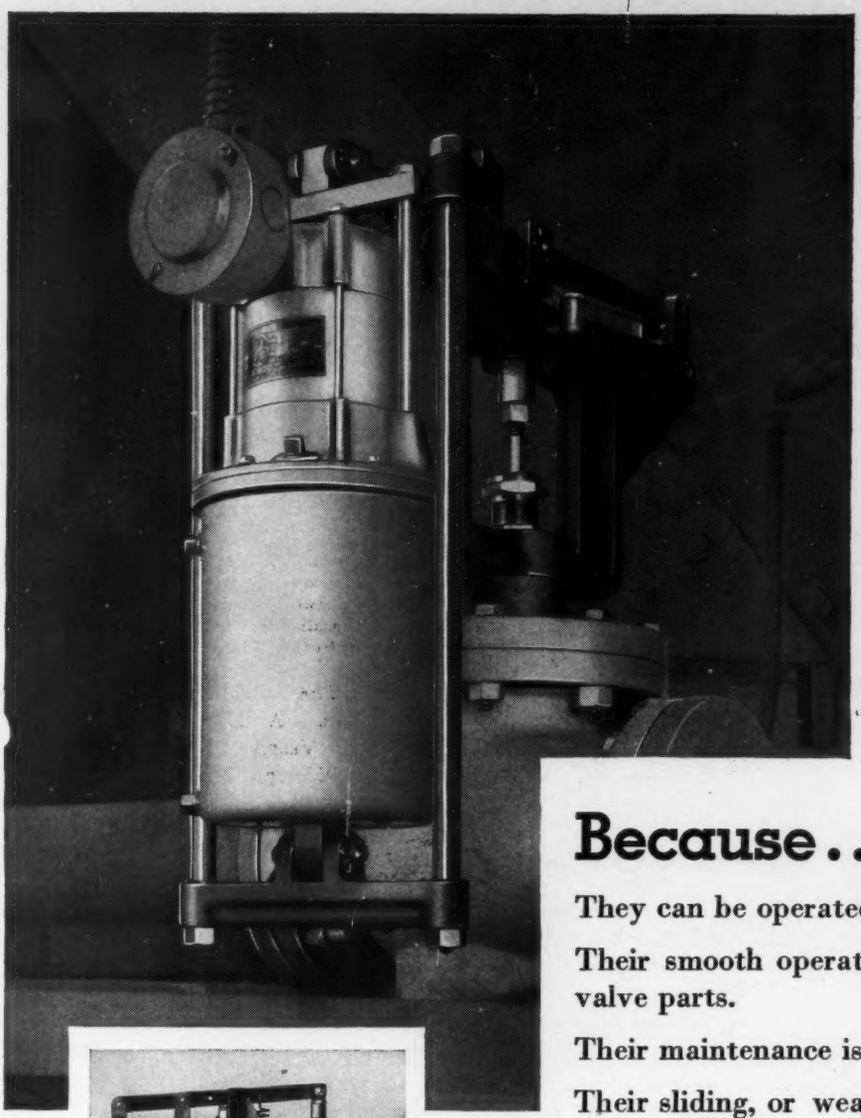

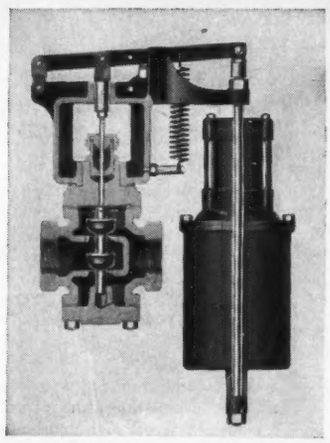

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SCIENCE AND TECHNOLOGY

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under the supervision of

DR. E. H. LESLIE and DR. H. B. COATS

The abstracts here presented are selected from the current literature of science and technology to afford reference to fundamental information not easily available to all readers. Abstracts of articles appearing in readily obtainable trade journals are not included.

Photostat copies of original articles will be supplied at cost by the Leslie Laboratories. Complete or limited bibliographies covering special topics by title, by abstract, or in complete manuscript, will also be prepared and furnished at reasonable cost by the Laboratories.

Chemical Composition and Reactions

Several Methods for the Detection and Separation of Branched-Chain Hydrocarbons from Natural and Synthetic Hydrocarbon Mixtures. A. SCHAARSCHMIDT. *Petroleum Z.* **28** (1932) No. 12, pp. 1-4.

If hydrocarbon mixtures, previously freed from olefin and aromatic hydrocarbons, are treated in the cold with $SbCl_3$, the separation of tertiary compounds as an oily or crystalline mass that assumes an intense violet color when agitated with alcohol is noted. Normal and quaternary compounds also react with $SbCl_5$ when heated but the reaction product turns brown with alcohol. By this method it was found that natural and cracked gasolines after separation of olefines and aromatics, consist largely of tertiary compounds.

Gum Deposits in Gas Distribution Systems. I. Liquid-Phase Gum. A. L. WARD, C. W. JORDAN AND W. H. FULWEILER. *Ind. Eng. Chem.* **24** (1932), *pp.* 969-976.

The problem of gum deposits in gas distributing systems is generally reviewed. Two types of gum deposits are distinguished: a neutral or slightly acid alkali-insoluble material of low nitrogen content and a strongly acid alkali-soluble material containing 5% or more nitrogen. The data and methods of study used are of interest to petroleum technologists since many are applicable in connection with cracking plant gases and the liquid products therefrom.

Autoxidation of Higher Hydrocarbons and Their Mixtures and Its Technical Significance. K. IVANOV. *Neftyanoe Khozyaistro* **22** (1932), pp. 85-94.

A very complete bibliography on oxidation methods and oxidation of substances of many kinds, including petroleum, is given. Paraffin base oils yield more fatty and less hydroxy acids than naphthene-base oils when exposed to the same oxidizing conditions. 3-hour oxidation of light oils in the presence of Na, Li, Mn, Fe, Pb, and Cn naphthenates resulted in converting 30% of the oils into high molecular weight acids, two-thirds of which were fatty acids suitable for soap making. Acid-treated Grosny gas-oil yielded 18.8% water—in sol. fatty acids and 12.3% hydroxy acids in 3 hrs. oxidation. Oils and distillates washed with tap water before oxidation had a 25-times higher degree of oxidation than those washed with distilled water. Catalysts generally increase the oxidizability of slightly refined oils. Highly refined oils are effected only slightly.

Fundamental Physical Data

Free Energy of Water, Carbon Monoxide, Carbon Dioxide and Methane. J. CHIPMAN. *Ind. Eng. Chem.* **24** (1932), pp. 1013-17.

Free energy equations for these substances are reviewed and equations in current use criticized on the basis of the data employed in deriving them. Expressions for the heat capacities of gases in the range 25-2000°C. are given. Equilibrium data are used in evaluating the integration constants of the free energy equations, the best sets of data being compared in each instance. A bibliography of 42 references is given.

Interfacial Tension Between Asphaltic Materials and Various Aqueous Solutions. R. N. TRAXLER AND C. U. PITTMAN. *Ind. Eng. Chem.* **24** (1932), pp. 1003-5.

The interfacial tension between asphaltic materials and alkaline solutions is of importance in connection with the preparation of bituminous emulsions. Determinations were made of the interfacial tension between fluxes from Venezuelan and Trinidad asphaltic crudes and aqueous solutions containing caustic soda and in some instances sodium and calcium chlorides.

Sodium chloride reduces and calcium chloride increases the interfacial tension. Used together the two salts counteract each other. The two asphalt fluxes behave differently toward sodium hydroxide solutions.

The Solubility of Oxygen in Mineral Oils. A. MAILLARD, E. VELLINGER AND R. VERDIER. *Ann. Comb. Liquides* **7** (1932), pp. 7-14.

The approximate solubility of oxygen in mineral oil was determined by saturating the oil with oxygen and then extracting the gas. Light should be excluded and the time should be minimized. The oxidizability of an oil depends on the refining treatment it has received. The quantity of oxygen dissolved in 100 cc. of oil at 20°C. and 760 mm. pressure is about 12 cc. regardless of the origin of the oil.

Manufacture Processes And Plant

The Calculation of Heat Transmission. M. FISHENDEN AND O. A. SAUNDERS. *H. M. Stationery Office,* 1932. 280 pp. Price 10s Od.

In this book on heat transmission the authors have brought together, in readily available form, the results of experimental investigations and have interpreted and compared them in the light of the fundamental principles of radiation, conduction, and convection. The subjects covered are radiation and radiant heat transfer, emission and absorption of radiation by gases and flames, conduction and heat transfer by conduction, convection, convection in gases and in liquids, heat transfer calculations, the principle of similarity, formulae for parallel and countercurrent flow, and physical constants for gases and liquids. A bibliography of 198 references and name and subject indexes are included. The book is a valuable contribution to this complicated subject.

An Experiment with Vapor-Phase Cracking in the Vickers Unit. E. F. KORORATZKII. *Neftyanoe Khozyaistuo* **22** (1932), pp. 217-22.

A kerosene distillate from a cracked oil was charged to the furnace at 175-250°F., left the

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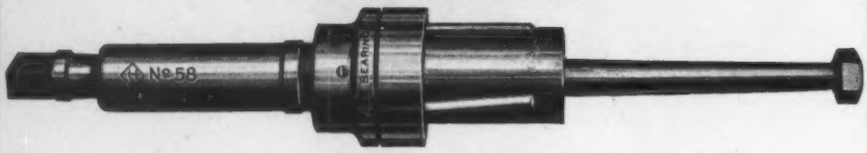

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furnace at 995°F., entered the reaction chamber, passed through the pressure reduction valve on the line from the top of the chamber, was quenched either with distillate or cracked residue to a temp. of 680°F., and was fractionated in the bubble tower. The gasoline produced (yield 30%) had the following properties: Aromatics 26%, I_2 No. 142; gasoline produced in liquid phase cracking (yield 25%) had: Aromatics 6.14% I_2 No. 9316. The vapor-phase gas has sp. gr. 1.2, CH_4 and H_2 23.3%, C_2H_4 and C_2H_6 30.9%, C_3H_6 and C_3H_8 27.9%, C_4H_8 and C_4H_{10} 12.0%, C_5 and higher 5.9%. The liquid phase gas has sp. gr. 1.093, CH_4 and H_2 45.2%, C_2H_4 and C_2H_6 22.3%, C_3H_6 and C_3H_8 20.7%, C_4H_8 and C_4H_{10} 7.4%, and C_5 and higher 4.4%. Cracking conditions, measurements of equipment, and other data are given.

The Neutralization of Crude Oils and Crude-Oil Distillates. P. M. E. SCHMITZ *Erdöl u. Teer* **8** (1932), pp. 27-9, 44-6.

Neutralization of light oils before treatment results in economy in chemicals and distillation, prevents emulsion formation in subsequent chemical treatment, and assists in the mfg. of new types of naphthenic acid mixtures. The same holds true for crudes and wax containing fractions for the preparation of petrolatum. Yields are higher and the bleaching earth performs more efficiently. Neutralization of heavy crudes assists hydrogenation at lower temperatures.

An Improvement in the Sulfuric Acid Refining of Cracked Gasoline. F. R. MOSER. *Petrol. Zeits.* **28** (1932) No. 26, pp. 4-6.

Acid treatment of unsaturated distillates results in the formation of di-alkyl sulfates that are not removed by a caustic wash but which decompose on distillation. These esters can be removed by hydrolyzing them with 20% or stronger NaOH in the presence of an emulsifying agent such as turkey-red oil. Continuous processing is practical. The caustic reagent can be used for a long time since only a small quantity is consumed. The esters are hydrolized to mono alkyl sulfates that react with the caustic soda. The same result can be accomplished in the laboratory by refluxing with alcoholic caustic potash without use of an emulsifying agent. The redistilled commercial product is better in color, and lower in S. and gum content than products made in the same manner but by omission of the hydrolysis.

A Selective Method of Acid Treatment for the Refining of Vapor Phase Cracked Distillates. E. RETAILLIAU. *Jour. Inst. Pet. Tech.* **18** (1932) pp. 723-8.

The treatment described includes a preliminary wash with a small amount of strong caustic soda, a treatment with dilute sulfuric acid, a treatment with a larger quantity of stronger (75%) sulfuric acid, and a final neutralizing wash with strong caustic. The first caustic wash removes acidic substances and causes polymerization of some substances. The dilute acid removes nitrogen bases and forms alcohols. The stronger acid polymerizes unstable saturated components. No water wash is used. The product is of good color, light stable, of low gum content, and of only 2 to 5 octane numbers less than the untreated distillates of the same boiling range.

Ethyl Alcohol from Refinery Gases. V. GERN, O. PIPIK AND E. MEZHEBORSKAYA. *Azerbaid. Neft. Choz.* 1932 No. 2, pp. 15-21.

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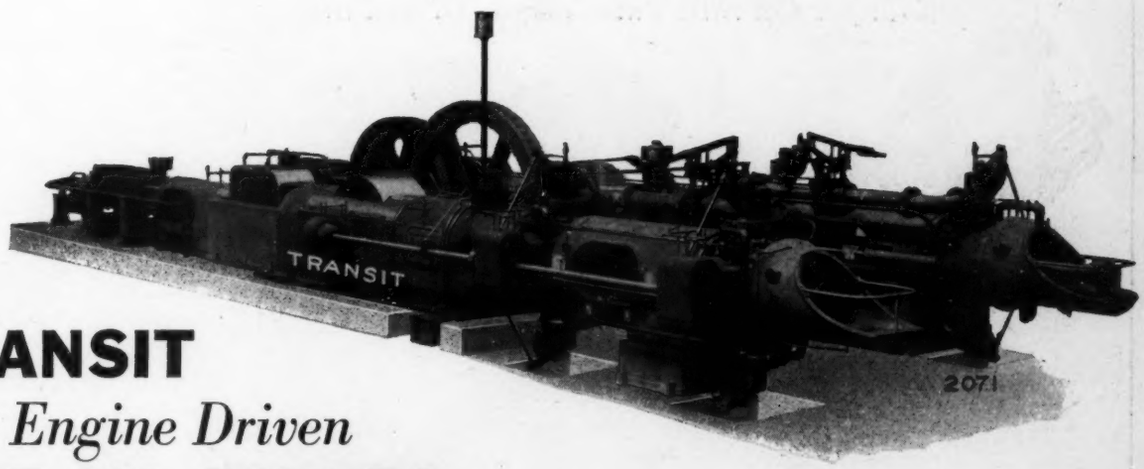

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Materials Used in Chemical Engineering Operations. B. E. Roetheli and H. O. Forrest. *Ind. Eng. Chem.* **24** (1932), pp. 1018-1027.

A tabulation of inorganic and organic substances and the materials of construction suitable for constructing various types of apparatus in which these substances are made or handled is given. The increasing extent to which chemical procedure is entering the petroleum refining business lends interest to the context of this article. Typical applications of special materials are illustrated pictorially.

Products: Properties, Utilization and Testing

Effect of Jacket and Valve Temperatures on Knock Ratings of Motor Fuels. F. H. Garner and E. M. Dodds. *Engineering* **134** (1932), p. 45.

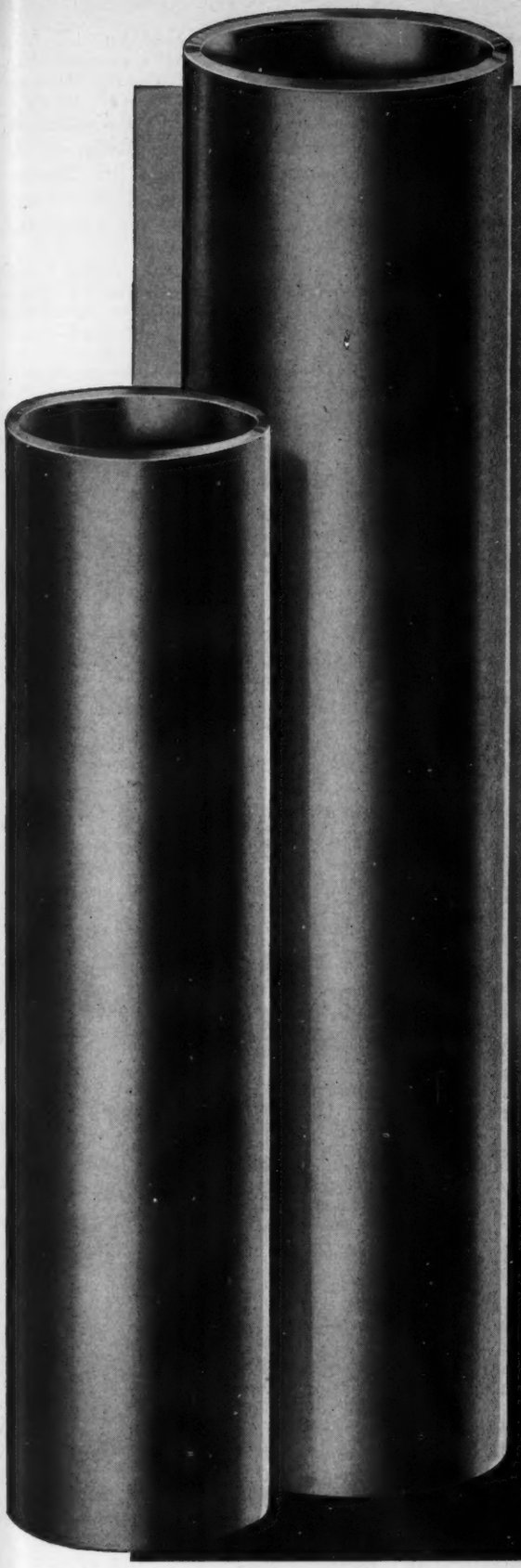
Three engines A, B, and C were used of 8.3, 8.3, and 6.3 compression ratios respectively. Each had an improved carburetor, and improved bouncing pin, and a non-oscillating spark ignition system. Engine A had solid valves and a liquid cooling system. Engine B was same as A except that the valves were liquid cooled. Engine C could be optionally air-cooled or liquid cooled. The reference fuel used was one of 50 octane. The equivalent proportions of benzol and tetraethyl lead to give the same degree of knocking on the three engines at different temperatures were determined. The results on engine A were little influenced by temperature. With engine B the differences were more marked. In every instance tetraethyl lead becomes more effective as an antiknock as the operating temperature is increased. This was clearly shown with engine C, air-cooled, and running at high temperature.

Five typical British petols, one highly cracked, were matched against blends of reference fuel with benzol and with lead. In engine A all fuels showed a slightly lower knock rating at the higher temperatures when compared with either benzol or lead. The ratings in engine B were higher than in A for the same temperature. In the air-cooled engine C much less lead was required to match the sample fuels at the higher temperatures, with one exception; but larger percentages of benzol were required at the higher temperatures. The cracked fuel required proportionately less benzol at high temperature than the other fuels.

A table is given comparing the ratings on the 3 engines at 212°F. Except for the cracked fuel the agreement is good. Tests at other temperatures showed widely varying results. The author emphasizes that to get consistent test results a standard engine and standard test conditions must be used.

Oxidation of Hydrocarbons and the Knocking of Engines. P. Mondain-Monral. *Bull. Soc. Encour. Ind. Natl.* **131** (1932), pp. 360-5.

Experimental evidence on the formation of peroxides in engines is given. It is concluded that under ordinary running conditions peroxides cannot form because the temperature of the mixture in the engine cylinder is not high enough. However, if the compression is raised, or if the engine heats abnormally through defective cooling, peroxides are formed in appreciable amounts. The velocity of their formation is high. Each molecule of peroxide is to be regarded as a center of latent energy that is liberated when reached by the explosion wave causing almost instantaneous combustion of the surrounding gas and producing a very high rate of flame propagation. The ideal anti-



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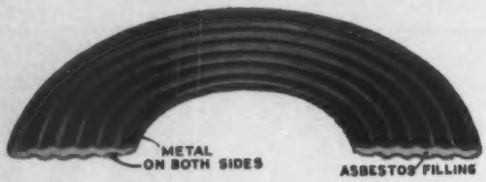

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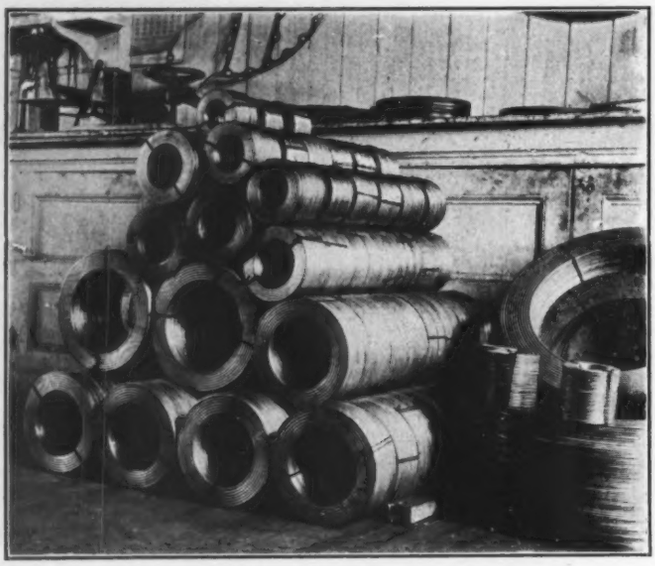

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knock compound would be one that when added in small amount would reduce peroxide formation. These conclusions confirm Dumanois' theory.

The Knock Rating of the Δ^a-Olefines. A Contribution to the Study of the Significance of Olefines in Cracked Petrol. F. H. GARDNER, R. WILKINSON AND A. W. NASH. *Jour. Soc. Chem. Ind.* **51** (1932), pp. 265T-270T.

The literature of anti-knock testing and of studies of the anti-knock properties of individual hydrocarbons is reviewed. The experimental work reported relates to the anti-knock properties of the olefin hydrocarbons and for the first time includes the gaseous olefines ethylene, propylene, and butylene on account of their importance in connection with airship fuels. The Graf Zeppelin normally runs on Blau gas, although in its recent round-the-world trip "Pyrofax" (propane + 2% butane) was mixed with hydrogen (36.8% in the mixed gas) to give a fuel gas of required sp. gr. The preparation of the olefin gases is described. Data on the octane numbers of solutions of the gaseous olefins in a reference fuel are given. Lead susceptibilities of these solutions were also determined.

Motor Fumes and Atmospheric Pollution. C. J. REGAN. *Jour. Soc. Chem. Ind.* **51** (1932), pp. 605.

Although the general conclusions of investigators is that motor fumes do not constitute an hazard to the ordinary uses of the streets, this verdict must be accepted with caution. Long exposure to low concentrations of carbon monoxide is more damaging to the tissues than short exposure to high concentrations. Also, as regards lead in the air from the combustion of ethyl gasoline, the Scottish verdict of "Not Proven," is more appropriate than one of "Not Guilty." Lead is a cumulative poison, and even in chronic poisoning from this cause the insidiousness of the symptoms frequently results in delay in diagnosis. A bibliography of 23 references is included.

Liquid Insecticide Bases. N. J. GOTHARD. *Manufacturing Chemist* **3** (1932), pp. 170-2.

A straight-run base, preferably from paraffin-base crude, is necessary in the author's opinion. The odor of cracked products cannot be tolerated notwithstanding the insecticidal value of the unsaturateds contained (94% down and 71% dead by the Peet-Grady method) to which Pannewitz has called attention. Polymerization of the unsaturateds would seriously injure the volatility of the spray and cause staining. The most practical distillation range is 350°F to 510°F, with 50% about 410°F. Too high volatility results in too rapid evaporation, and with too low volatility the spray settles too rapidly and also causes stains. Minimum flash point by the Tag. closed cup is 120°F. The base should be so refined that its odor will not interfere with the essential oil odors used for perfuming.

Testing Transformer and Switch Oils. Italian Electro-Technical Association. *Olii Min.* **12** (1932), pp. 50-4, 65-8.

The required properties and methods of testing are outlined. Sp. gr. @15°C. 0.85-0.92; Engler Viscosity @ 20°C. 8°, at 50°C 2.5°, at 75°C. 1.5°; flash point 140°C (minimum) inorganic alkalinity or acidity, nil; organic acidity 0.05% (maximum) as oleic acid; non-reactive sulfur 0.25% (maximum). The apparatus and method for determining fluidity is given. The mean dielectric strength (instantaneous) using 10 mm. spheres 5 mm. apart must not be less than 40,000 V. Resistance to deterioration is determined by heating 40 g. of the oil with 2 g. of copper gauze (400 mesh) for 300 hrs. at 110°C. The deposit is determined by filter-

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We want you to know that we have solved your gum problem The credit goes to Universal's research men; the benefits go to you if you want them

The remedy is an effective liquid inhibitor

Add one gallon (or less) of it to 100 barrels of your gasoline and you can forget all about gum

This is now a fact—proved by treating millions of barrels of various cracked gasolines

Dubbs licensees can get this inhibitor at a preferred low price—one more advantage of being a Dubbs licensee But the price to other refiners is low enough to give a substantial saving over other methods

Would you like to prove this inhibitor in your own gasoline? Then write us

The sooner you do, the sooner your gum troubles are over

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By H. J. Hall
President

Universal Oil Products Co
Chicago Illinois

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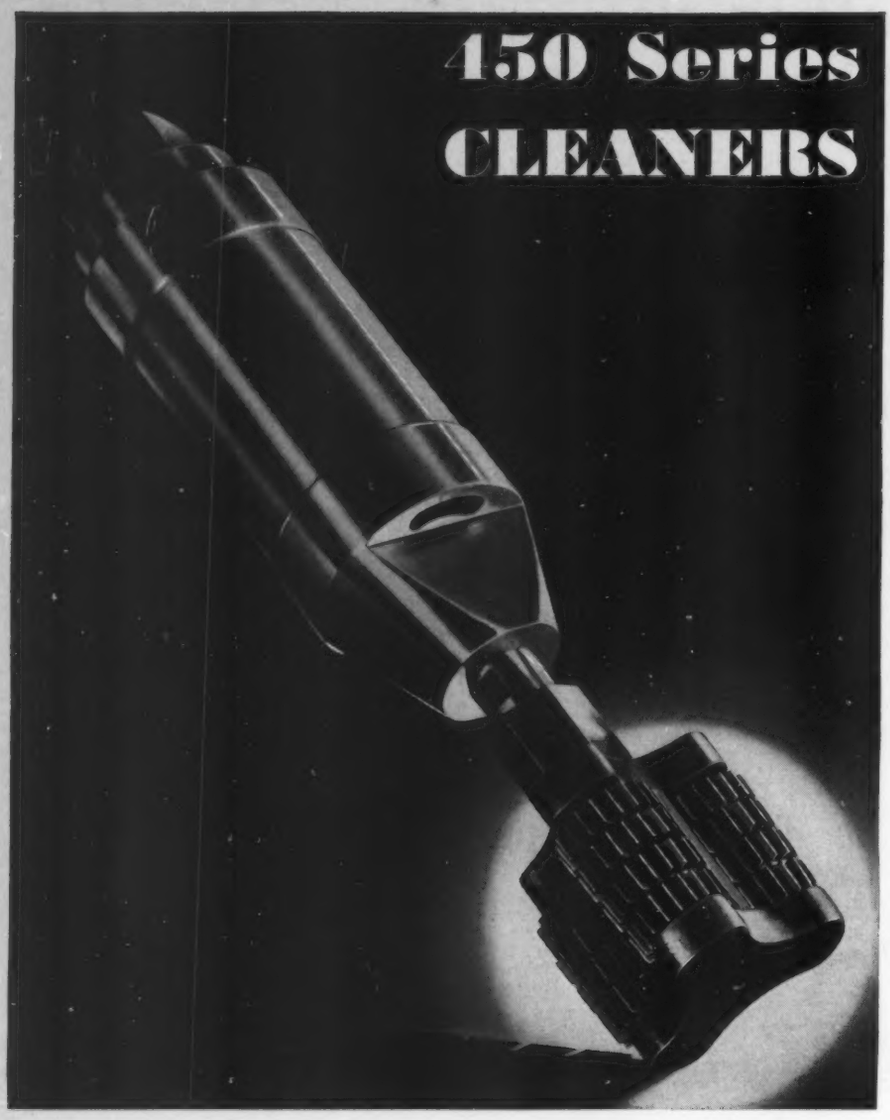
Speed up still tube cleaning

with LAGONDA

450 Series CLEANERS



IF you haven't tried the new Lagonda 450 series cleaners, specially designed for cleaning still tubes, you don't know how fast a thorough job of still cleaning can be obtained. These machines have been designed from cutter head to hose coupling for the needs of refineries. Longer bodies give more power. Special hardening adds strength and durability, and new positive lubrication and refined design of bearing assure maintenance of sustained high speed.

Put Lagonda 450 series cleaners to work in your stills and shave a goodly saving off the cost of still tube cleaning.

Bulletin X-13 describes these cleaners and will be sent upon your request.

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SPRINGFIELD, OHIO
FUEL SAVING SPECIALISTS

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ATLANTA, SAN FRANCISCO, MONTREAL, LONDON
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X-1492

ing, washing with benzine, drying, and weighing. It must not exceed 0.5%. The acidity of the filtered oil must not be over 0.25% as oleic acid. The effect of the oil on cotton is determined by immersing cotton in the oil under conditions of the deterioration test and determining the breaking strength. The final strength must be 60% or more of the original.

Viscosity and Flow Solidity of Viscous Mineral Oils. A. GEMANT. *Sitzber. Preuss. Akad. Wiss. Physik.-math. Klasse* 1932 No. 14, pp. 168-81, (1932).

Some viscous mineral oils possess the property of flow-solidity (fliessfestigkeit) that is characteristic of aqueous colloidal solutions. They retain their form because they comprise a liquid phase enmeshed in a fine framework or external phase, and are forced through a tube as a whole rather than by the slip of one concentric layer over another. Flow-solidity is unrelated to viscosity. Among a number of cylinder and motor oils tested, two had the property of flow-solidity or elasticity. This was more marked as the temperature was lowered. One of these oils was probably from a paraffin-base crude. Flow-solidity is determined by the limiting pressure required to induce flow of the oil in the viscosity tube. In contrast, viscosity is determined by the rate of flow in tubes.

The Determination of the Vapor Pressure of Gasoline According to the Method Used by the Bataafsche Petroleum Mij. ANON. *Jour. Inst. Pet. Tech.* **18** (1932), pp. 716-22.

The importance of knowing the vapor pressure before any appreciable evaporation has occurred is stressed in connection with preparing and controlling cargoes for shipment, calculation of evaporation losses, and storage tank pressure. The "B.P.M." method excludes the effect of air, CO_2, and water, and is such as to determine the vapor pressure with a minimum evaporation of the sample. The sample is handled in such manner as to avoid loss of volatile components. The apparatus and method are described in detail.

Charitschkoff Reaction (for Naphthenic Acids). A. LUFT. *Petroleum Z.* **28** (1932) No. 24, pp. 16-17.

The reaction was tested by using dilute sodium salts derived from the hydrolysis of methyl naphthenates from Polish and American mineral oil distillates, and by substituting benzene or ethyl ether for petroleum ether. Tests were made in the presence of phenol, potass. mineral oil sulfonates, and asphalts. The sensitiveness is less than 1% when benzene and ethyl ether are used. The effect of phenols is negligible, that of sulfonates slight, but small amounts of asphalt mask the reaction. The author concludes that the sensitivity is about 0.1% and not 1-3% as formerly thought. The solvent used should be stated.

Natural Gasoline

Progress in Rectification of the Light Petroleum Hydrocarbons. S. C. CARNEY. *Jour. Inst. Petrol. Tech.* **18** (1932), pp. 701-15.

The application of fractionation in the production of natural gasoline and related products is reviewed historically. Reasons for events and trends in this field are given. The basic philosophy of fractionation is discussed in an original and interesting manner, and the conceptions presented are illustrated by applying them to the operation of gasoline columns. The manner of control of fractionating columns is discussed in relationship to operating phenomena. The probable future trend of control and design is briefly covered.

GYRO ... THE FULL PROMISE OF VAPOR PHASE CRACKING REALIZED

THE last two years of large scale commercial application—covering the manufacture and sale of millions of gallons of gasoline, here and abroad—have shown that the vapor phase promise of a way to make better gasoline without using higher cracking pressures or chemical reagents is fully realized in the Gyro Vapor Phase Cracking Process.

Let's be specific. This experience has shown:

1. That Gyro Process makes a gasoline of *86 Octane Number* (C. F. R. Research Method) from parafine base crude and proportionately higher from naphthenic bases, and this gasoline has about 7% greater energy content than other motor fuels.
2. That it operates successfully at 10 pounds pressure, with 50 pounds the maximum at any point.

3. That 45-day runs are common practice and an operating efficiency of 92% is maintained as a yearly average.
4. That it has brought yields and costs into line with the most exacting commercial requirements.
5. That motor fuels made by blending Gyro cracked gasoline with straight run gasoline have met with extraordinary market success.

Alco Products, as exclusive licensor for the Gyro Process throughout the world, except Canada, offers a complete consulting engineering and fabricating service to licensees, and will be glad to enter into communication with refiners interested in the process.

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DIVISION OF AMERICAN LOCOMOTIVE COMPANY

ENGINEERING DESIGN, FABRICATION, ERECTION *of Gyro Vapor Phase Cracking Plants, Atmospheric and Vacuum Distillation Units, Tube Stills, Fractionating Towers, Treating Plants, Gasoline Absorption, Stabilizing and Debutanizing Plants, and all types of Heat Exchange Equipment.*

REFINERY ENGINEERS *turn to* NATIONAL SEAMLESS *for* CONDENSER PIPING

Following the adoption of Seamless Pipe for high pressure and high temperature lines, refinery engineers carry forward the "safety first" idea by adopting NATIONAL Seamless Pipe for condenser service. The possibility of split welds or open seams is thus entirely removed, as well as other uncertainties about pipe with a longitudinal line of weakness.

Seamless pipe has no weld—therefore it is safe pipe. It is one continuous piece of steel, pierced from a solid billet, expanded and rolled at temperatures which produce grain refinement and uniform transverse and longitudinal strength and ductility.

Seamless pipe is workable and accommodating where bends, flanges, or cross-overs have to be made and it is readily adaptable to the use of any kind of joint.

To specify NATIONAL Seamless Pipe for condenser service is in line with strictly modern refinery practice. Such practice is to install the highest quality tubular material to safeguard life and property, to increase the effectiveness of operating units, and to secure long, trouble-free service.

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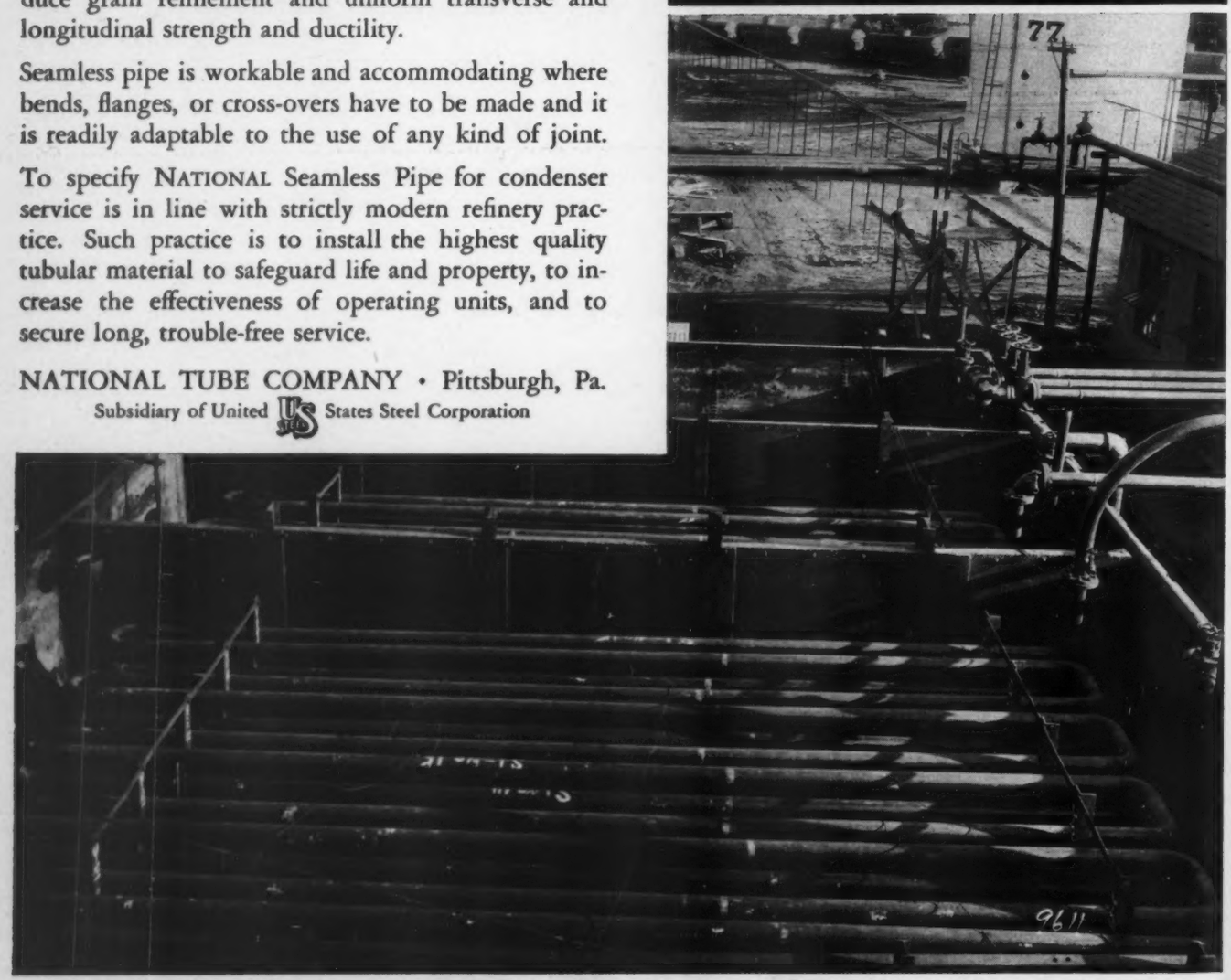


NATIONAL SEAMLESS

PIERCED FROM SOLID BILLETS - NO WELDS

THE MONTH IN REVIEW

Economics Committee Forecasts Demand Drop

TWO committees forcasting motor fuel consumption for the six months period October, 1932, to March, 1933, and reporting to the American Petroleum Institute general session Tuesday, November 15, stated that a substantial decline in consumption will be experienced.

The decline forecast by the committee of refinery statistics and economics of the American Petroleum Institute gave 11.6 per cent as the indicated decrease for this period in comparison with corresponding months of 1931. The volunteer committee of petroleum economics of the Federal Oil Conservation Board placed the decline for the period at 10.1 per cent.

The A. P. I. committee made a study of both reports previous to the general session and added the following statement concerning gasoline consumption:

"To sum up the reports, it would appear that the industry will most likely experience the lowest relative consumption during the period of this forcast that it has felt for a number of years . . . the daily crude run to stills should be reduced approximately 100,000 barrels from present levels." These are the two most important conclusions to be drawn from the reports and it depends entirely upon the individual company executives whether the industry shall continue to keep its present statistical advantages and show improvement.

Each report went into detail concerning stocks of crude oil and gasoline as well as oil production. The volunteer committee set 57,670,000 barrels as the limit of gasoline that should be held in storage April 1, 1933. The A. P. I. committee placed gasoline stocks at the same data at 56,760,000. The tone of both reports was to the effect that the industry faces the necessity of further reduction of crude oil production, further reduction of crude oil stocks, and further decreasing of crude oil run to stills.

The Division of Refining, at its first session devoted its study to refinery maintenance problems, corrosion and refinery inspection. The second session of this division was held jointly with the Division of Marketing at which time the economic outlets for petroleum products were discussed. The products included natural gasoline and liquified gases, furnace oils, fuel oils and petroleum coke. The last session of the Refining Division is given over to new developments of interest to petroleum refiners, with especial emphasis given to solvent processes for the manufacture of lubricants, and the problems of extreme pressure lubricants.

Dr. R. P. Anderson, Division of Refining, was one of the busiest men in the convention. He is secretary of more committee sessions, division of refining sessions, and "off the program" he's officiating with several other national associations in similar capacity, all to the end that "Doc" could never be found in his room or office. It was said that he kept a card file, and a come-up system, so that he could know where to go next—and why.

Industry Makes Good Showing in Safety

SAFETY came in for its highest play in A. P. I. circles as a preliminary of the general session at Houston, when William R. Boyd, Jr., executive vice president, announced awards for the year. He said that the record of the petroleum industry for 1931 was 6½ per cent better than the average record for all American industries. The awards were in the form of certificates, issued to companies on the following basis.

For the best safety record in all departments, Texas Pacific Coal & Oil Company, Fort Worth.

For the refining department employing more than 1600 men, Standard Oil Company (Indiana).

For the refining department employing fewer than 1600 men, General Petroleum Corporation, Los Angeles.

For the marketing department employing more than 2000 men, Standard Oil Company (Indiana).

For the marketing department employing fewer than 2000 men, Independent Oil Company, Winnebargo, Minnesota.

For the production department employing more than 1000 men, Empire Companies, Bartlesville, Oklahoma.

For the production department employing fewer than 1000 men, Fullerton Oil Company, Fullerton, California.

For the natural gasoline department employing more than 160 men, Midwest Refining Company, Casper, Wyoming.

For the natural gasoline department employing fewer than 160 men, Lone Star Gas Company, Dallas, Texas.

For the pipe line department employing more than 500 men, Oklahoma Pipe Line Company, Muskogee, Oklahoma.

For the pipe line department employing fewer than 500 men, Texas Pacifc Coal & Oil Company, Fort Worth, Texas.

Construction Program Will Be Continued

DESPITE the fact that construction work in refineries this year has been more vigorous than anticipated there "is more on the boards" at present than at any time during recent years. Many major extensions are under consideration and while it is apparent that a number of expansion programs will be held in abeyance, perhaps through the remainder of this year, the industry will continue to erect reforming, cracking, and gasoline recovery and stabilization systems throughout the next few months.

Reforming units of later design are approaching higher pressures in their operation, and manufacturers of equipment state that inquiries are reaching them regarding materials for pressures upwards to 3000 pounds per square inch. Pump manufacturers are getting hot oil pump lines ready for operating at pressures in order of 2500 to 3000 pounds discharge pressure. Higher pressures, especially in the range noted, are being used by a few of the larger companies, with others studying this type of process. Reports state that higher octane values are produced, lessened quantities of gas, larger yields through better conversion, at the higher pressures and temperatures. Offsetting these advantages, however, are the disadvantages of higher first costs and short life of the equipment. Concensus of opinion at present, indicates that 3000 pounds as about the maximum for high pressure reforming or cracking.

With proposals for construction of new refineries in Canada, South America, Mexico, and Continental Europe, interest is focused on foreign developments, and the ultimate further inroads upon American export volume. American manufacturers of refinery equipment are somewhat at a disadvantage where foreign governments insist upon as much as 60 per cent of such equipment being constructed in their respective countries. Erection of refineries is slow work in most foreign countries because factories do not carry stocks, and for the most part, work "on order" only. Further,

but few foreign manufacturers can furnish the highly scientific fabrication and assembly demanded by modern refining practice—and the American manufacturer is securing and will secure the bulk of this business.

The trend in construction work in this country continues to be mostly enlargement, expansion or replacement of cracking facilities, with the usual accompanying enlargement or expansion of the gasoline recovery and stabilization system. Many refineries are also being forced to enlargement of their power plants and water circulation system.

The industry remains out of balance in so far as quantities of straight-run gasoline as compared to quantities of cracked gasoline are concerned. The trend, however, in motor fuel history, both past and in the future, is toward ever increasing production of cracked motor fuel. The proportion of cracked gasoline produced is not yet equal to that of straight-run, but is gradually approaching a balance. Present operations are yielding about 24.5 per cent straight-run from the barrel of crude, as against 19.5 per cent cracked motor fuel. Three refining districts in this country, however, are consistently producing more cracked gasoline than straight-run, and this is the coming manner of operation—for the market for straight-run gasoline is diminishing.

Another development is noted in the efforts of some companies to more highly fractionate their straight-run gasoline, selecting and extracting by efficient fractionation those portions of the natural motor fuel best fitted for anti-knock gasoline, and discarding the remaining fractions or parts which are "bad knockers," which can be marketed as special naphthas or solvents. This calls for additional well designed fractionating columns and for additional processing.

World Petroleum Directory Published

A new directory of petroleum covering oil companies in the United States and 103 foreign countries has been published by Russell Palmer, publisher of World Petroleum, called World Petroleum Directory, and it can be secured from Gulf Publishing Company, Houston, Texas, price $10.00.

In the directory are listed American oil producers, oil refineries, natural gasoline manufacturers, and pipe line operators alphabetically, oil marketers and jobbers by states; compounders, grease and asphalt makers, and refining companies by states, giving location of plants, capacities, company official and operating personnel. Headquarters of oil companies over the world are given, officers, financial data, properties and other pertinent information.

Recommendations for Heat Exchange Equipment

THE Committee on Tubular Heat-Exchange Equipment for Oil Refining Service of the American Society of Mechanical Engineers, Petroleum Division, has completed its work and prepared its recommendations for distribution. The recommendations cover a definite outline of procedure for design, construction practice and testing of heat exchange equipment, in order to provide a uniform standard of comparison for heat transfer rates in design and performance test.

It is hoped that when the value of equipment involved warrants such tests, both refiner and manufacturer will conduct the performance test as outlined in the recommendations. The booklet is divided into four parts: purchase data, shop tests, performance tests, and appendix. Part 1 emphasizes the data that refiners should supply to manufacturers when requesting proposals on heat exchange equipment. Part 2 deals with the shop inspection and shop tests. Part 3 outlines the specifications for conducting performance tests after it has been put into operation. Part 4, the appendix, deals with general subjects, such as factors of design, fouling resistance, methods of cleaning, in addition to general comments concerning the preceding parts.

The personnel of the committee developing the recommendations includes T. H. Hamilton, consulting engineer, chairman, refining committee, petroleum division, A. S. M. E.; H. E. Bethon, secretary; E. H. Barlow, manager and assistant chief engineer, Standard Oil Development Company; R. R. Collins, vice president, The Lummus Company; George Gibson, sales engineer, C. H. Leach Company; A. C. Gronbeck, district manager, Southwestern Engineering Corporation; M. B. Higgins, chief designer, The Texas Company; D. S. Mallett, designing engineer, The Tide Water Oil Company; Walter Samans, chief engineer, The Atlantic Refining Company; E. N. Sieder, manager heat exchange department, Foster Wheeler Corporation; C. J. Wahl, manager heat exchange department, M. W. Kellogg Company.

Catalytic Oxidation In the Vapor Phase

Petroleum technologists will find much of value in the new book "The Catalytic Oxidation of Organic Compounds in the Vapor Phase," by L. F. Marek and D. A. Hahn, published as an American Chemical Society Monograph, issued by the Chemical Catalog Company, Inc., published in October, 1932, and available through The Gulf Publishing Company, Houston, Texas, 486 pages. Price $9.00.

Catalytic vapor phase oxidation has long been used in the oxidation of methanol. The vapor phase oxidation of aromatic hydrocarbons has made available cheap phthalic anhydride, synthetic anthraquinone, cheap malic, and succinic acids, chloride free benzaldehyde, benzoic acid, etc. From petroleum oils oxidation is furnishing new chemical materials. Oxidation is looked to as a means for the economic utilization of cheap gaseous paraffin hydrocarbons.

The book comprehensively covers the literature on these and other oxidation processes up to and through the greater part of 1931. It reviews the subject of surface combustion, the combustion of motor fuels and anti-knock action, the production of hydrogen where oxidation reactions are involved, and furnish much information on catalytic decomposition and synthesis of alipathic compounds. The 15 chapters cover the following subjects: Catalysis; Catalytic Decomposition of Alcohols; Oxidation of Alcohols to Aldehydes and Acids; reactions Involved in the Synthesis of Hydrocarbons and Alcohols from Water Gas; Oxidation of Methanol to Formaldehyde; Oxidation of Gaseous Paraffin Hydrocarbons; Oxidation and Hydration of Olefins and Acetylene; Oxidation of Petroleum oils; Production of Hydrogen from Methane; Surface Combustion; The Cause and Suppression of Knocking in Internal Combustion Engines; The Oxidation of benzene and its Derivatives; The Oxidation of Naphthalene; the Oxidation of Anthracene and Miscellaneous Polynuclear Compounds, and a chapter to description of apparatus for oxidation processes.

The book will prove of real interest and value to research workers and technologists in the field of oxidation reactions, to those interested in the general field of catalysis, to workers in the field of the internal combustion engine, to organic and industrial chemists, and especially to petroleum technologists.

New Book On Chemical Engineering

"UNIT Processes and Principles of Chemical Engineering," edited by John C. Olsen, Professor of Chemical Engineering, The Polytechnic Institute, Brooklyn, New York, presents information of direct value to the refinery engineer that may be applied instantly in technical work. This work explains the principles of chemical engineering and how to apply such principles in engineering practice. It provides practical information required for good results in plant design and operation, and is the latest work of this type, including data up to April 15, 1932. The following chapter heads indicate its application to refinery

engineering work: Heat and Power; Flow of Heat; Evaporation, Principles of Fractional Distillation, Filtration, Drying, Catalytic Processes, Absorption of Gases, Separation of Solids and Liquids from Gases; Materials of Construction, and Plant Location. While much of the work applies to industries kindred to petroleum refining, there will be found a great deal of important information in the text, formulas, charts, diagrams, which will prove of value as a reference work in the library of the engineer, superintendent and chemist. The book is available through Gulf Publishing Company, Box 1307, Houston, Texas. Price $5.00.

New Knock Test Manual Issued

STANDARD Inspection Laboratories of Standard Oil Development Company has issued supplementary instruction to be added to "Instructions for Measuring Anti-Knock Value of Fuels," to be used until the first of the year, at which time an entirely new book of instructions will be distributed.

Detailed instructions for making knock tests with the C. F. R. engine under new test conditions recently adopted by the Cooperative Fuel Research Steering Committee will be presented along with instructions to be used with Series 30 engines to secure good correlation. Provision will be made for rating aviation gasolines pending adoption of a C. F. R. Aviation Method.

Since issuing the 1931 instruction book former reference fuels have been replaced by others. Fuel C-6, a straight-run gasoline of 76 octane number is now available in quantities for use in conjunction with fuel A-2 for blends between 50 and 76 octane number. Above 76 octane, fuel C-6 will be used with lead.

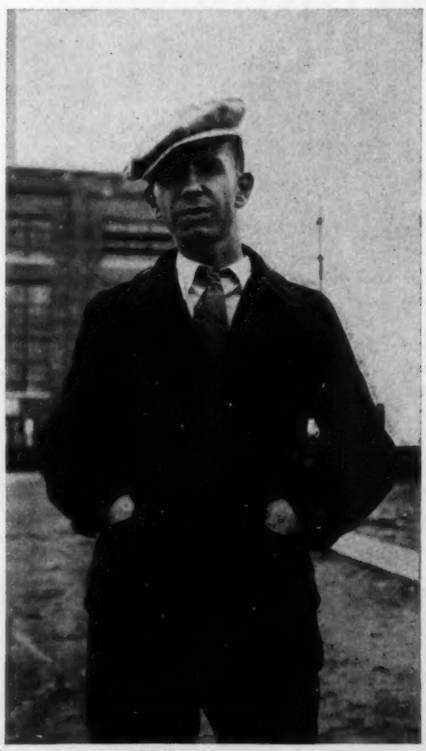
Bureau Reports on Oklahoma City Oils

"ANALYSIS of Crude Oils from the Oklahoma City Field, Oklahoma," is ready for distribution by the Bureau of Mines (as R. I. 3180), and can be secured free from the Section of Publications. The analyses of 21 representative crude oils from various producing zones of the field are presented. The report includes one analysis of oil from the Hoover sand, two from the Oolitic lime, three from the Lower Simpson sand, one from the lower Simpson and Wilcox sands, six from the Wilcox sand and eight from the Arbuckle lime. Tables are presented showing sources of the samples, and figures indicating physical and chemical properties of the various crude oils, in addition to the regulation Bureau of Mines detailed analysis of each sample.

The report states that analysis of samples of petroleum from the Oklahoma City field show (1) that the oils produced in the field are similar and (2) that the oil also is similar to that produced in the Seminole field (analysis of which is included) of Oklahoma. The principal differences between the two oils are that the oil from Seminole is classified as intermediate base, whereas the bulk of the production from the Oklahoma City field is classified as paraffin base by the Bureau of Mines method of analysis and classification, and the sulphur content of the oils from Seminole is approximately double that of the Oklahoma City field crude.

McGrath Finds Control Lab Better Than School Kids

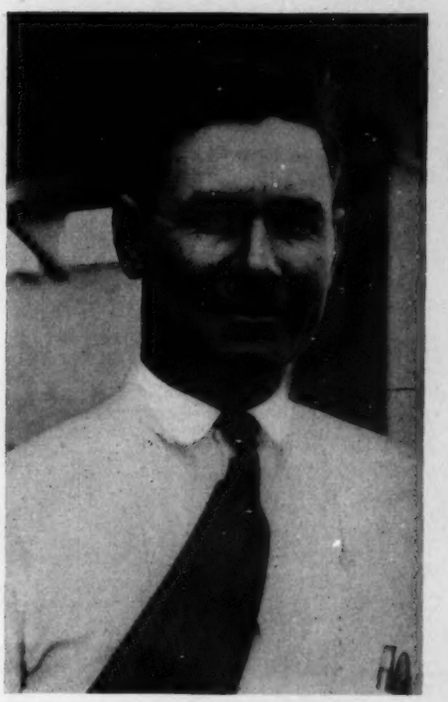
R. V. McGRATH, resident chemist, Empire Oil & Refining Company, Okmulgee, Oklahoma, when he finished school at William Jewell College, Liberty, Missouri, 1925, with an A.B. (chemistry) thought that teaching would be a great job. Being from Missouri, he had to be shown. One year was enough. Immediately after that school year he looked around and found a position with Empire Oil & Refining Company, and in a few short years was promoted to his present job as resident chemist. His control laboratory is located in a building occupied by the company's general laboratory at the Okmulgee plant, so he has opportunity to dig out a lot of information concerning petroleum chemistry that is not enjoyed by many plant chemists. Incidentally, he is still convinced that the task of running a control laboratory (sulfides, sulphates, alkalies and acids, not withstanding) is much more pleasant than moulding the thoughts and opinions of a younger generation.



R. V. McGRATH

Eldred Goes From Natural Gasoline to Refining

M. S. ELDRED, in charge of operation of the Waggoner Refining Company refinery at Electra, Texas, began his experience in the petroleum industry, particularly in the natural gasoline business, with Hirt & MacDermott in the old Hogtown area in Central Texas. With this firm Eldred both operated the existing plants when he took charge and designed and erected additional plants. In 1928 he went "on his own," designing and building several plants in Texas and California. Later Waggoner Refining Company desired his services in the operation and expansion of a partially erected plant in the Waggoner "Pasture" southwest of Electra. After completion of this job he was brought into the refinery and given the position of refinery superintendent. An article concerning one of the late additions to his plant appeared in The Refiner, July, 1932, "Viscosity Breaker Increase Yield of Cracking Stock."



M. S. ELDRED

Hightower Heads Oil Group Of National Safety Council

Washington, D. C.—C. L. Hightower with Texas Pacific Coal & Oil Company at Thurber, Texas, was elected general chairman of the petroleum section of the National Safety Council at its twenty-first annual congress held in Washington, D. C. last month.

Other officers elected for the petro-

leum section were: E. R. Alden of New York, Vacuum Oil Company, general vice chairman; R. W. Black, of Elizabeth, New Jersey, Standard Oil Company of New Jersey, chairman of the Atlantic division; J. C. Bernd of East Chicago, Indiana, chairman of the Great Lakes division; J. C. Young of Tulsa, Tidewater Companies, chairman of the Mid-Continent division; H. C. Renz of Dallas, Texas, Atlantic Oil Producing Company, chairman of the Gulf Coast division; T. N. Shaw of Casper, Wyoming, Midwest Refining Company, chairman of the Rocky Mountain division, and L. F. Knox of Los Angeles, chairman of the Pacific Coast division.

Functional committee chairmen selected during the congress were: H. L. Dischinger of St. Louis, Shell Petroleum Corporation, poster; G. O. Lockwood of Bartlesville, Oklahoma, Empire Companies, engineering; B. V. Osborn of Casper, Standard Oil Company of Indiana, publicity; J. L. Risinger of Beaumont, Texas, Magnolia Petroleum Company, program; J. W. Meyers of New York, Standard Oil Company of New Jersey, statistics; Dr. C. M. Aves of Houston, Humble Oil & Refining Company, health.

A. W. Breeland of Lone Star Gas Company of Dallas was elected editor of the council's news letter.

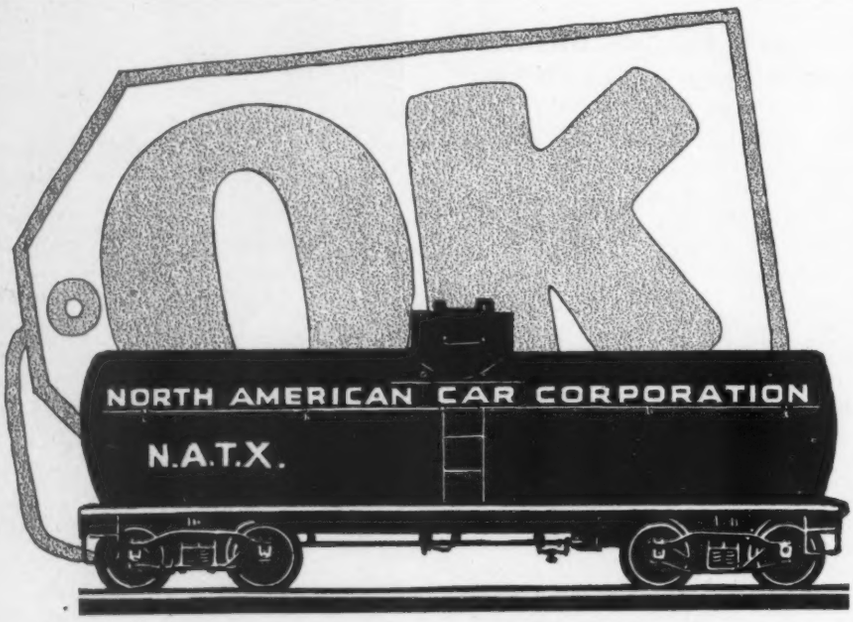
Lyon Looks After Eason's Standards

G. B. LYON, chief chemist, for Eason Oil Company at its Enid, Oklahoma, refinery, left the University of Kansas at the age of 20 with an A.B. degree, and entered the employ of Empire Oil & Refining Company. With this concern from 1921 to 1923 he was resident chemist at a couple of plants. In 1923 he was employed by Eason Oil Company and sent to Enid as chief chemist with the usual responsibilities of the chemists looking after standards —treating pressure distillate continuously, manufacture of greases, lubricating oil production, and ethylizing motor fuels.

G. B. LYON

Chemical Exposition Set for 1933

THE Fourteenth Exposition of Chemical Industries is now definitely scheduled for the week of December 4, 1933, according to announcement by Charles F. Roth, manager and vice president of the International Exposition Company, which has organized and directed the presentation of the chemical exposition since the first one was held in New York City in 1915. Already plans for the next show, more accurately designated as the Fourteenth Exposition of Chemical Industries, have been under way for some



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NORTH AMERICAN CAR CORPORATION

N. L. HOWARD, *President*

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months, in line with previous plans to hold the event early in 1933.

Thoughtful consideration of the dates previously scheduled for the exposition by a number of exhibitors and by the management has resulted in a decision to postpone it to the week of December 4, 1933. The selection of these dates will bring the exposition at a time co-incident with the annual meetings of the American Society of Mechanical Engineers and of the American Society of Refrigerating Engineers, the members of which, it is believed, will welcome the opportunity to attend the exposition. They will furnish an additional audience of buyers. It is probable also that certain of the national chemical organizations may arrange New York meetings during the same week.

The new dates will allow exhibitors more time to plan and prepare their exhibits, possibly more latitude in their plans through coming at a time when more generous outlay, both of time and money, on exhibits may seem more justified. Decision of the management on the dates December 4-9, 1933, indicates the selection of a week which is good in many ways. Viewed broadly this selection seems bound to insure a greater number and more enthusiastic exhibitors, a larger attendance, and trading on a larger scale.

Tariff Found No Big Help

THAT the oil tariff is doomed when Congress convenes under the new administration, is the opinion of several oil men from the East attending the American Petroleum Institute meeting in Houston.

On the other hand it was pointed out that California, Oklahoma, Texas, Kansas, Louisiana and Arkansas favored the tariff.

Imposition of the excise tax on imported petroleum will not serve to eliminate foreign competition with the American product, but merely change the scene from the United States to foreign markets, it was declared November 15 by officials of the Department of Commerce at Washington.

Commenting upon the experience of the first four months operation under the law, it was pointed out that while it is still difficult to forecast the long range trend, there are indications that some of the foreign countries which during the first half of this year were exporting to the United States are now shipping their oil to other markets where, however, it will continue to compete with the American product. This is particularly true, it was stated, with respect to oil from the Netherland West Indies which formerly came to the country but is now being shipped to Europe.

One Refinery Purchased 2686 SARCO STEAM TRAPS

Among the refineries that use Sarco Steam Traps are 80 of the most important concerns. We give here the names of just a few so you may see the calibre of the refineries that pin their faith to Sarco Steam Traps.

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Kendall Refining Co.
Magnolia Petroleum Corp.
National Refining Co.
Ohio Valley Refining Co.
Old Dutch Refining Co.
Shell Oil Co.
Standard Oil Co. of Calif.
Standard Oil Co. of Kans.
Standard Oil Co. of Ky.
Standard Oil Co. of Ohio
Standard Oil Co. of N. Y.
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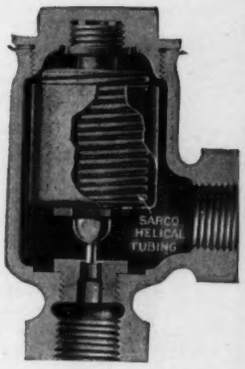

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▼ PLANT ACTIVITIES ▼

Lease Plant: Altitude Petroleum Corporation, Tulsa, has leased a 3000-barrel refinery formerly operated by Interstate Rubber Company, near Kansas City, Mo. Plant equipped with Muehl cracking process. Will modernize and improve to run 1000 barrels; five-year lease with optional purchase clause.

Gasoline Plant: Royalite Oil Company, Calgary, Ontario, announcement by J. H. McLeod, president and western production manager for Imperial Oil Co., Ltd., to build $500,000 absorption gasoline plant in the Turner Valley field. Company handling construction; to finish March, 1933.

Extraction Plant: The British Burmah Petroleum Company (not to be confused with Burmah Oil Company) will take over large tracts called "torbanite" fields in Eastern Transvaal, Africa, to extract oil from torbanite deposits.

Operating: Cooper-Potter Refining Company, Kilgore, Texas, operating 500-barrel skimming plant recently completed, after damage by fire while testing. (Refiner, October, 1932, page 58A.)

Cracking Planned: La Salle Petroleum Company, Ltd., Montreal, Canada, owned by Joseph Elie, Ltd., reported planning installation of cracking facilities early next year.

Cracking: Sinclair Refining Company, Fort Worth refinery, $700,000, Sinclair type cracking process and auxiliary systems, also tentative plans for modernization of Sand Springs, Oklahoma refinery. (Refiner, May, 1932, page 61A). Building combination skimming and cracking unit at Kansas City, Kansas, plant.

Stabilization: Deep Rock Oil Company, Cushing, Oklahoma, installing stabilizing capacity for 2500 barrels of pressure distillate, and oil absorption gasoline recovery plant to handle 2,500,000 feet of gas daily; contract for design and equipment to Burrell-Mase Engineering Company, and company forces will install.

Improvements: Standard Oil Company of New Jersey has announced through S. B. Hunt, vice president and treasurer, that the company plans spending $20,000,000 for improvements, rehabilitation and maintenance of its plants in the United States, during the period September 1, 1932, to June 30, 1933. New work will affect all department's of the company's domestic refineries.

Refinery: Pennant Refining Company is erecting a 400-barrel skimming plant on Kilgore-Gladewater highway, East Texas field. Company organized by Milton A. Callaway, owner of chain of service stations at Dallas.

Gasoline Plant: Montana Power Company is building a 20,000,000 cubic feet capacity high pressure absorption gasoline plant near Cut Bank, Montana, to handle gas from the Cut Bank field, J. A. Campbell Engineering Company design, erected by Stearns-Rogers Manufacturing Company.

Refinery: McNutt Oil & Refining Company, El Paso, Texas, building 1000-barrel skimming plant, to process West Texas crudes. C. M. McNutt (owner of chain of service stations, El Paso) president, Emil Geppelt, Dallas, consulting engineer, vice president.

Gasoline Plant: Clymore Company, Inc., Refugio, Texas, completed erection gasoline plant, Saxet Oil Company, Ryals lease, Refugio field, capacity 25,000,000 feet, organized in July (Refiner, August, 1932, page 54A) by Garland Glymore, Gordon Shelton, both of Refugio and W. L. Pearson, Houston. Reported O. R. Seagraves holds an interest in the company, which will take gas from properties of Saxet Oil Company, Mission Drilling Company, Moody-Seagraves Oil Company and Pearson Properties, Inc.

Refinery: The Uruguayan Government, Montevideo, in later announcements since July (Refiner, August, 1932, page 54A) states that it plans declaring a petroleum monopoly; will build a $1,000,000 refinery, a $500,000 alcohol plant, market blended fuel.

Purchase: Haskell Oil & Refining Corporation, owned by H. P. Downs, Fort Worth, purchased Breckenridge refinery of Starlight Refining Company, (G. A. Sonricker, owner), rated 750 barrels.

Cracking: Wilshire Oil Company, Los Angeles, reported planning erection of cracking equipment, considering battery of Dubbs units, no definite announcement.

Cracking: General Petroleum Corporation, Los Angeles, according to later reports concerning expansion at Torrance refinery involving $1,500,000 expenditure, will install 5000-barrel Cross cracking unit. M. W. Kellogg Contract, and new distillation and stabilization facilities; Foster Wheeler Contract through Consolidated Steel Corporation. (Refiner, Oct., 1932, page 58A).

Refinery: General Petroleum, Ltd., purchased Refinery site South side of Edmonton, Ontario, Canada, to erect first unit of refinery, 1400 barrels capacity. Company headed by Lars Olson, Calgary, Ontario.

Acquisition: Ohio Oil Company purchased from The Reserve Petroleum Company a 2500-gallon absorption gasoline plant at Haynesville, Louisiana, and half of the latter company's oil production in that field.

Gasoline Plant: The Midland Gasoline Corporation, Trinity Life Building, Fort Worth, is reported planning construction of a 10,000,000 cubic feet gasoline absorption plant in the Conroe field, Montgomery County, Texas.

Refinery: Allegany Refineries, Inc., capitalized at $500,000, plans erection of $300,000 refinery at Bolivar, N. Y., to process crude from Nile-Clarksville district; has taken over gathering lines of Bradford Transit Company. New concern is headed by A. L. Shaner of Bolivar.

Stabilizer: Union Oil Company of California has started construction of pressure distillate stabilization system at Wilmington refinery; reported cost, $170,000; contract through Consolidated Steel Company to Foster-Wheeler Corporation. (Refiner, October, 1932, page 58A).

Edeleanu Unit: Azneft Oil Trust, U. S. S. R., has ordered an Edeleanu type treating plant for use at Baku, to operate in connection with Alco Products, Inc., tube stills processing heavy Baku crudes to lubricating oils.

Refinery: J. A. McBride, president, Crown Oil Company, is reported organizing new com-

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4″	75	6½
6″	200	6
8″	375	8
10″	500	8
12″	1000	10

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pany to erect small skimming plant at Weyburn, Saskatchewan, Canada.

Cracking Unit: Quaker State Oil Refining Corporation is installing a Dubbs reforming (cracking) unit at plant of McKean County Refining Company, near Bradford, Pa., 1500 barrels capacity, high pressure, charging naphtha. This is third unit at plants of the Quaker State concern, others being at Elmenton Refining Company and Ohio Valley Refining Company plants.

Cracking Plant: The Imperial Japanese Navy has entered into license agreement with Gasoline Products Company to build 1000-barrel cracking plant near Kudamatsu, Japan; erection by M. W. Kellogg Company. Plant will include stabilization system. Same purchasers have contracted with Alco Products, Inc., for construction of one unit of Gyro vapor phase cracking system for January delivery.

Refinery: Donleon Refining Company, Oklahoma City, building 2000-barrel combination skimming and cracking plant. Leon Melekov President, C. H. Fox, vice president, W. U. Paul, secretary-treasurer, Paul Miller, formerly Continental Oil Company, superintendent.

Asphalt Process: Imperial Oil Company, Ltd., Sarnia, Ontario, after developing a new process for manufacture of an asphalt paving mixture, has paved 1¼ miles of road north of Sarnia to test the product.

Stabilizer: Lincoln Oil Refining Company, Robinson, Illinois, has completed installation of absorption type recovery plant and stabilization system. Contract, Black, Sivalls & Bryson, capacity, 3,500,000 cubic feet gas.

Refinery: Perry Jay, Consumers Oil & Refining Company, and Royal D. Saulsbury, Newcastle, Wyoming, completed erection of 150-barrel skimming plant at Clearmont, Wyoming, on the Burlington railroad.

Expansion: Imperial Oil Company, Ltd., plans expansion of refining facilities at Dartmouth, near Halifax, Nova Scotia, Canada.

Refinery: R. X. Cook, formerly superintendent for Humble Oil & Refining Company, is erecting a 1000-barrel refinery at Gladewater, Texas, East Texas field.

Refinery: Locke Refining Company is building a 1500-barrel refinery at Gladewater, East Texas field.

McAlear Manufacturing Company, Chicago, announces that D. B. Kelly has been placed in charge of the refinery division sales. Mr. Kelly was formerly general superintendent of Globe Oil & Refining Company plant at Lamont, Illinois, and earlier was in charge of the American Refining Company plant at Wichita Falls, Texas.

E. D. Bullard Company, manufacturers and distributors of industrial safety equipment, have enlarged their facilities at Salt Lake City and Houston.

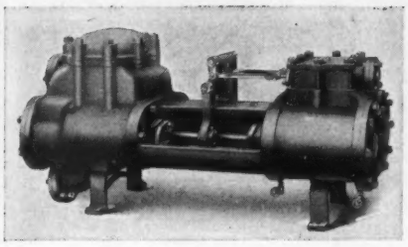
The Salt Lake City office of E. D. Bullard, Company is in charge of Jack Coombs, is located at 1620 Yalecrest Ave., Salt Lake City. The new address of the Bullard Houston office, in charge of J. J. Delahide, is No. 1 Main Street.

Republic Steel Corporation, Youngstown, Ohio, announces appointment of J. E. McFate, formerly associated with Jones & Laughlin Steel Corporation, as sales representative. Mr. McFate's headquarters will be in Boston.

New Equipment for the Modern Plant

1. Horizontal Steam Pumps

WORTHINGTON PUMP AND MACHINERY CORPORATION



Worthington Pump and Machinery Corporation, Harrison, New Jersey, announces an improved line of horizontal duplex steam pumps, especially designed and fitted for handling either water or chemical solutions. Built in three different types—valve plate, turret and pot valve—these units incorporate many new features, foremost among which is the adoption of stainless steel drop forged valve service on all models.

The valve plate type pumps have the discharge valves screwed into a common removable deck. These units are of the submerged piston type with all suction and discharge valves above the cylinders. Valve service is of the disc type, and all pumps have the standard duplex steam end.

For transfer, tank, circulating, boiler feed and water supply service, units of this group are standard fitted and have forced-in liners and screwed stuffing boxes. For collecting condensate returns from heating systems and returning them to the boiler, these pumps are furnished complete with receiver and automatic float control. For handling brine, caustic, solutions and special liquids, the units are all-iron fitted; for handling acids and acid solutions they are all-bronze throughout. This group covers capacities from five to 320 gallons per minute at pressures up to 250 pounds per square inch.

Turret type pumps have the suction and discharge valve decks cast integral with the cylinders, are of the submerged piston design and have disc type valve service. Suction valves are accessible through handhole plates and discharge valves through the top cover. Stuffing boxes are of the bolted type with bolted glands.

Standard fitted (with forced-in cylinders) for all water service and all-iron fitted (with removable NiResist liners) for handling caustic solutions, turret type pumps are available for capacities of 150 to 840 gallons per minute for discharge pressures to 75 pounds per square inch and with capacities of 100 to 500 gallons per minute for pressures up to 200 pounds per square inch.

Pumps of the pot valve pattern, all with submerged pistons, come in three types: For pressures up to 500 pounds per square inch with a capacity of 40 to 96 gallons per minute they have a special steam end with suction valves accessible through discharge valve seats. Stuffing box glands are bolted, piston rods are divided, cylinder liners are removable and valve service is of the poppet type.

For boiler feed service, capacities of 15 to 760 gallons per minute and discharge pressures to 300 pounds per square inch, standard steam ends are utilized and liquid ends are of the outside end-packed-plunger pot valve pattern with bronze wing-type valve service.

For pressures up to 500 pounds per square inch and capacities of 140 to 1800 gallons per minute, cylinders are fitted with bronze liners and liquid piston rods of stainless steel. Valve service, either disc or poppet type depending upon the pressure, is mounted in removable discharge valve decks. Stuffing boxes and glands are of the extra-deep bolted type.

2. Fluid Meters

BAILEY METER COMPANY

Bailey Meter Company, Cleveland, Ohio, announces the manufacture of a new line of fluid meters for the measurement of steam, water, gases, and other fluids.

Three general combinations of meters are available; indicating and integrating; recording and integrating; indicating, recording, and integrating.

The recording and integrating fluid meter makes the record in pounds per hour, gallons per minute, or any other desired units on a 12-inch diameter, 24-hour chart. Accurate analysis of the record is equally easy throughout the entire

Bailey Recording Meter

flow range since the flow graduations are uniformly spaced. This feature also facilitates comparison with records of pressure and temperature which may be obtained on the same chart, when desired, by incorporating auxiliary recorders in the flow meter casing. The total flow is given in pounds, gallons or other units by a six-unit counter which is located behind a small window in the meter name plate. This may be read as easily as an automobile mileage register.

The flow mechanism is operated by the difference in pressure produced between the inlet side and the outlet side of the orifice or other primary element inserted in the pipe line. The inlet, or higher pressure, is connected to the interior of the mercury sealed Ledoux Bell, and the outlet or lower pressure is applied to the exterior of the bell. The bell responds to changes in the differential pressure, and moves up or down as a frictionless piston; it being shaped so that its vertical movement is directly proportional to the change in the rate of flow. Guide links direct the bell in a definite path. By

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3. Portable Arc Welder

HARNISCHFEGER CORPORATION

Harnischfeger Corporation, 4400 West National Avenue, Milwaukee, Wisconsin, announces a recently designed P & H Hansen gasoline-driven arc welder. It is built for immediate accessability and can be hooked onto a truck or pleasure car.

The welders are built in 100, 200, 300, 400 and 600 ampere sizes in the stationary and portable types. Engines of all sizes run at 1750 revolutions per minute. Waukesha engines, equipped with Ricardo heads, pressure oiling systems, and built-in governors are used to power the welders, a flexible coupling being used to connect the engine with the welding generator. The generator is equipped with a panel board containing voltmeter and ammeter, and cable terminal studs with large hand screw clamps. Control for regulating welding current is mounted on the commutator end of the generator.

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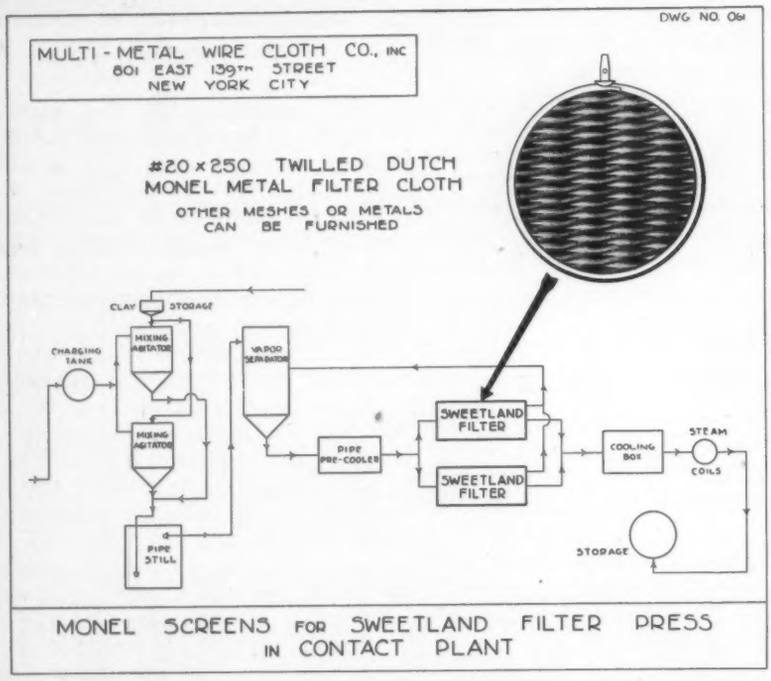

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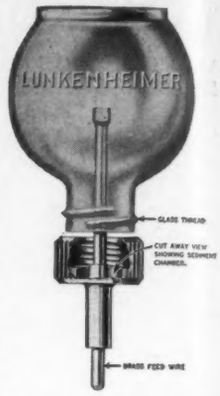
4. Bottle Oiler

THE LUNKENHEIMER COMPANY

The Lunkenheimer Company, Cincinnati, Ohio, announces manufacture of a new design bottle oiler made up of three major parts —glass bottle with threaded neck, bronze base with integral sleeve type shank, and brass feed wire.



The oiler, designed for lubrication of plain bearings, is automatic, feeding only when the lubricated shaft is in operation. Two principles are involved in the design of a feed wire oiler: thermal breathing, or periodic expansion and contraction of the air within the bottle due to changes in temperature, and capillary creep—aided by agitation of the feed wire when the shaft is in motion.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of The Refiner and Natural Gasoline Manufacturer, published monthly at Houston, Texas, for October 1st, 1932.

State of Texas, County of Harris: ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared A. L. Burns, who, having been duly sworn according to law, deposes and says that he is the Business Manager of The Refiner and Natural Gasoline Manufacturer and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: R. L. Dudley, 3238 Huntington Drive, Houston, Texas.

Editorial Director: S. W. Robinson, 5002 Scotland, Houston, Texas.

Editor: Grady Triplett, 2202 Dunstan Road, Houston, Texas.

Managing Editor: J. Kent Ridley, 605 Sul Ross, Houston, Texas.

Business Manager: A. L. Burns, 4311 San Jacinto, Houston, Texas.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

The Gulf Publishing Company, Houston, Texas; James Anderson, Houston, Texas; R. L. Blaffer, Houston, Texas; Mrs. Sarah Campbell Blaffer, Houston, Texas; A. L. Burns, Houston, Texas; J. F. Carter, Jr., Tulsa, Okla.; Dr. N. L. Dudley, Goose Creek, Texas; R. L. Dudley, Houston, Texas; W. S. Farish, Houston, Texas; Wm. V. Gross, Houston, Texas; Houston National Bank, Houston, Texas; Howard R. Hughes, Houston, Texas; Chas. H. Lane, Houston, Texas; Wallace E. Pratt, Houston, Texas; J. Kent Ridley, Houston, Texas; S. W. Robinson, Houston, Texas; R. P. Swinsky, New York, N. Y.; O. R. Waller, Chicago, Ill.

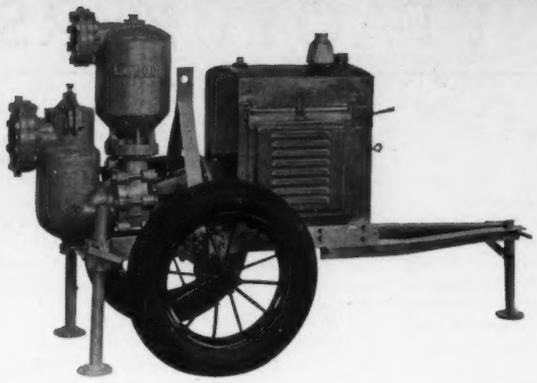
3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that ony other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

A. L. BURNS,
Business Manager.

Sworn to and subscribed before me this 4th day of October, 1932.
(Seal)

J. KENT RIDLEY
(My commission expires June 30, 1933.)



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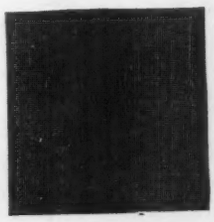

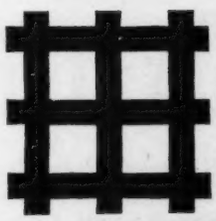

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ITEMS ABOUT MANUFACTURERS

Maintenance Engineering Corporation, Houston, Texas, announces its representation of Emil Greiner Company, New York, New York, manufacturers of instruments, laboratory glassware and apparatus. R. E. O'Neill, sales representative of Maintenance Engineering Corporation, will have charge of this account.

Republic Steel Corporation, Youngstown, Ohio, announces the appointment of J. E. McFate, formerly associated with Jones & Laughlin Steel Corporation, as sales representative. Mr. McFate's headquarters will be in Boston.

Worthing Pump and Machinery Corporation, Harrison, New Jersey, and Gamon Meter Company, 282 South Street, Newark, New Jersey, have made arrangements for the joint use of the manufacturing, engineering, sales and service facilities of the Meter Divisions of the two concerns. George H. Gleeson will head the meter sales activities of both companies.

General Electric Company announces the number of stockholders as of September 30, 1932, was 178,579, an increase of more than five thousand in the third quarter of the year and a gain of more than 38,800, or 28 per cent, over a year ago. The number on record as of June 30, 1932, was 173,243, and on September 30, 1931, it was 139,697.

Arthur G. McKee & Company, Cleveland, Ohio, and Struthers Wells-Titusville Corporation, Warren, Pennsylvania, have effected an association whereby their combined services are now available to the refining industry, as designers, engineers, contractor and manufacturers. No change in individual identity or ownership is involved, but the arrangement enables the two companies to cooperate closely in the construction of complete refineries and centralizes the responsibility for design, materials and performance.

Alco Products, Inc., has announced acquisition of exclusive licensing, sales, engineering and manufacturing rights for the Gyro cracking process under agreement with Gyro Process Company of Detroit. The agreement is in effect throughout the world except Canada. The process operates at low pressure, and in the vapor-phase, producing distillate of high octane value and the residue gas is used as a base at some refineries for the preparation of synthetic products. The process was developed by engineers of The Pure Oil Company. With this cracking process Alco Products, Inc., has rounded out its engineering service for the refining industry, having acquired Jackson Engineering Corporation in March, thus securing processes for natural gasoline manufacture, recovery and stabilization systems.

The Dorr Company, 247 Park Avenue, New York, through recent arrangements with Turbo-Mixer Corporation, New York, has acquired exclusive sales rights for the Turbo-Mixer and other Turbo equipment in certain of its principle fields. Henceforth The Dorr Company will offer agitators and mixers of both its own and Turbo-Mixer design.

Maintenance Engineering Corporation, Houston, Texas, announces the appointment of A. J. Hooper as sales engineer, to assist in the promotion of the more technical specialties for refineries, pipe lines and power plants, particularly water conditioning in connection with Hall Laboratories, Inc., Buromin Company, and Hagan Corporation, of Pittsburgh. Mr. Hooper is a graduate of Tulane University in chemical engineering and has been connected with the technology department of the Shell Petroleum Corporation, Houston, for the past three years.

The Kron Company, Bridgeport, Connecticut, announces that Glenn E. Weist, formerly sales engineer with the Milwaukee Electric Hoist division of the Harnischfeger Company, Milwaukee, has joined the company. Mr. Weist is in charge of engineering. He is a graduate of Purdue University.

Lincoln Electric Company, Cleveland, Ohio, announces appointment of Fred C. Archer as manager of the Philadelphia district. The Philadelphia office of Lincoln Electric Company is located at 401 North Broad Street.

Universal Valve & Fittings Company, East 38th Street and N. Y. C. R. R., Cleveland, has been appointed agent in that district for Kieley & Mueller, Inc., of New York City, manufacturers of pressure control devices and allied specialties.

Roots-Connersville-Wilbraham, Connersville, Indiana, announce removal of their New York office to 24 State Street.

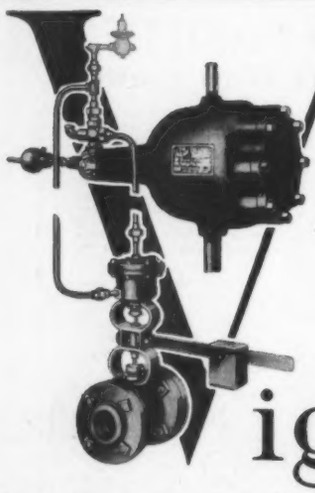
Jenkins Petroleum Process Company, 844 Rush Street, Chicago, Illinois, has recently announced that Southwestern Engineering Corporation has been appointed exclusive representatives in the United States to engineer, sell, manufacture and erect cracking units to be operated under license from Jenkins Petroleum Process Company. Southwestern Engineering Corporation will make use of its large manufacturing facilities and with engineering and sales organizations located in Los Angeles, Tulsa and Philadelphia, will be in a position to render service at any point in the United States.

The McAlear Manufacturing Company, 1901 South Western Avenue, Chicago, Illinois, makers of pressure and level control equipment, have secured the services of D. B. Kelley to head the refinery division.

In error it was published in a recent issue of this magazine that Me-Terj-ol Sales Company, Burt Building, Dallas, Texas, was sales and distribution agency for products of Me-Terj-ol Products, Incorporated, New York.

A letter calling attention to the error states that Southwestern Me-Terj-ol Company's principal is Reeves M. Lane of Dallas, who represents the New York corporation in Oklahoma and part of Texas, and that W. J. Exum of Houston is the principal of Me-Terj-ol Exum Sales Company and represents the New York corporation in all of Louisiana and in Beaumont, Galveston, Houston, and Port Arthur, Texas.

D. M. Archer has been appointed representative of the Sarco Company for the New England States, with offices at 11 Wolf Street, W. Roxbury, Boston, Mass. He will handle the full line of Sarco Steam Specialties.



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Helpful Publications Which Manufacturers Will Gladly Send Free for the Asking

Stainless Tubing

Carpenter Steel Company, Welded Alloy Tube Division, 100 Broadway, New York, in a six-page folder includes illustrations, general information, physical properties, and working instructions on Carpenter stainless welded tubes.

Pipe Price Card

Republic Steel Corporation, Youngstown, Ohio, has issued a new price card, No. 4, effective October 1, 1932, on Toncan copper molybdenum iron pipe, which embodies a simplified method of computing prices and reflects slight changes in prices of Toncan iron pipe.

Glyco Products Company, Incorporated, Bush Terminal Building No. 5, Brooklyn, New York, announces that all the miscellaneous literature describing emulsifying agents, synthetic waxes, resins, etc., has been incorporated into a handy booklet for filing. A number of new emulsion formulae and new products are included therein.

Blowers

The Elliott Company, Jeanette, Pa., has ready for distribution bulletins P-4 and P-5, respectively 32 and 20 pages, dealing with centrifugal blowers and compressors, multi-stage and single-stage types.

Control

The Foxboro Company, Foxboro, Mass., has prepared Bulletin 177—48 pages dealing with temperature controllers, charts and accessories, and introduces a novel self-indexing system.

Heater

Griscom-Russell Company, 285 Madison Avenue, New York, has ready for distribution a folder dealing with its recently developed oil storage tank heaters.

Alloy Metals

American Sheet & Tin Plate Company, Pittsburgh, has prepared a 25-page bulletin on physical properties and chemical data relating to its stainless steel sheets and light plates.

Pumps

De Laval Steam Turbine Company, Trenton, New Jersey, has ready for mail, Catalogs B-4 and B-5, respectively 16 and 24 pages on single stage, double suction, centrifugal pumps and single suction multi-stage centrifugal pumps.

Lime

Haden Lime Company, 1720 Shepherd Street, Houston, is distributing an interestingly written and valuable book dealing with the utilization of lime in all departments and processes of the refinery where alkalies are used. The book is a thorough engineering work, well illustrated with charts, diagrams and photographs, and will prove a valuable addition to the library of interested engineers, chemists and superintendents.

Return Bends

Stockham Pipe & Fitting Company, Birmingham, Alabama, has prepared a 12-page bulletin describing its complete line of return bend fittings for oil refining.

Steel Grating

Blaw-Knox Company, Pittsburgh, has prepared an attractive folder illustrating and describing Blaw-Knox electro-forged steel grating, which consists of a rectangular mesh, built up of flat bearing bars crossed at right angles by twisted cross bars, the intersection being made one-piece by electric forging under enormous pressure.

Supercentrifuge

Sharples Specialty Company, 23rd & Westmoreland Streets, Philadelphia, is distributing "Super Centrifugal Force in Xtraction," a 14-page bulletin dealing with the Sharples Super-Xtractor, a fully continuous centrifugal extractor for dewatering of crystalline products and allied problems.

Valves

Worthington Pump & Machinery Corporation, Harrison, New Jersey, has prepared a leaflet describing hydraulic by-pass and check valves for automatic control of accumulator supply pumps. These valves make possible continuous running of pumps when it is impractical to "start-and-stop" control by means of rise and fall of the accumulator.

Control Valves

Atlas Valve Company, 282 South St., Newark, New Jersey, in a four-page bulletin describes Atlas lever operated control valves with adjustable port opening, stating it is suitable for use with any standard control device; port opening can be adjusted to suit load; fitted with parabolic type gradual opening seats; will eliminate hunting action; capable of being adjusted for minimum flows; no by-pass around valve is required.

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Professor of Chemical Engineering, The Polytechnical Institute, Brookly, N. Y.

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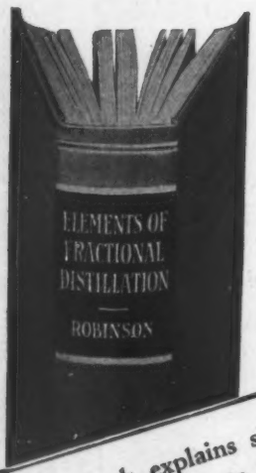

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Assistant Professor of Chemical Engineering, Massachusetts' Institute of Technology

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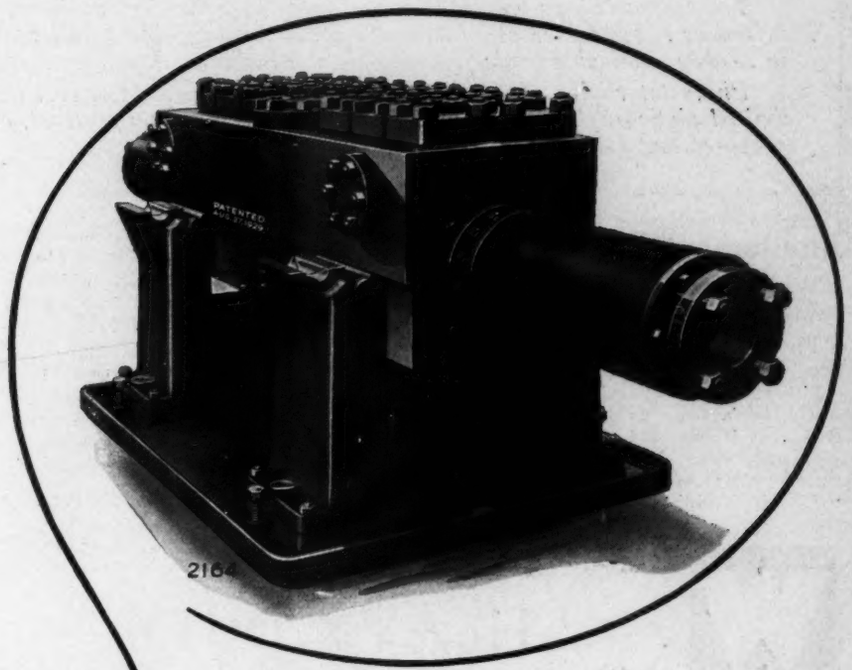
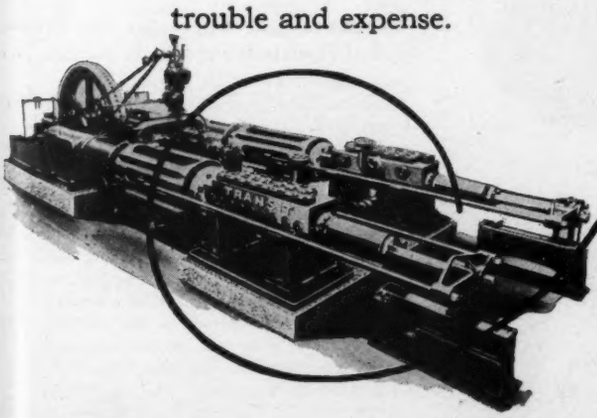


SEE to it that the fluid bodies of your hot oil pumps are properly mounted, and you will side-step a lot of trouble and expense.



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by

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under the supervision of

DR. E. H. LESLIE and DR. H. B. COATS

The abstracts here presented are selected from the current literature of science and technology to afford reference to fundamental information not easily available to all readers. Abstracts of articles appearing in readily obtainable trade journals are not included.

Photostat copies of original articles will be supplied at cost by the Leslie Laboratories. Complete or limited bibliographies covering special topics by title, by abstract, or in complete manuscript, will also be prepared and furnished at reasonable cost by the Laboratories.

Fundamental Physical Data

Vapor-Liquid Equilibrium Curves of Petroleum Fractions. S. N. OBRYADCHAKOFF, *Ind. Eng. Chem* **24** (1932) pp. 1155-60.

Distillation data and equilibrium data are presented for a large number of fractions and crudes. It is concluded that distillation curves with equal slopes have the same equilibrium curves. Blends of various proportions of materials giving distillation curves with the same slope have similar equilibrium curves. Equilibrium curve for fractions with a small slope, and probably for all materials within the accuracy required by engineering calculations, does not depend on the temperature at which the equilibrium vaporization is made nor on the temperature of the point of separation between the light and heavy components. Equilibrium curves for petroleum fractions or crudes, particularly if based on true boiling point analyses, are similar to those of binary solutions.

The Heat Capacity and Free Energy of Formation of Ethylene Gas. M. E. HASS & S. STEGMAN, *J. Phys. Chem.* **36** (1932) pp. 2127-32.

The specific heat of gaseous ethylene was measured by a constant-flow method over the temperature range 2.5°C. to 66.8°C. The results are given by the equation $C_p = 4.064 + 0.02022T$ and are accurate to within 1%. From the determined data and other data from the literature the free energy of formation of the gas was computed for temperatures from 0°C. to 1000°C.

The Heat Conductivities of Insulating Materials at Low Temperatures. E. RAISCH & W. WEYH, *Z. ges. Kalte-Ind.* **39** (1932) pp. 123-5.

Data are given for the conductivities of fibrous asbestos, silk, cotton, powd. MgO, mineral wool, wooly silk, powd. silicic acid, and granular cork for the temperature range —200°C. to 50°C.

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Chemical Composition and Reactions

Methods and Apparatus for Oxidation of Hydrocarbons. L. F. MAREK, *Ind. Eng. Chem.* **24** (1932) pp. 1103-7.

Aromatic hydrocarbons require extensive oxidation in the presence of a catalyst at elevated temperature before desirable intermediate products are formed. The intermediate products represent definite resistance points in the oxidation, and permit high per-pass yields. Reaction heat can be recovered. In contrast to this, aliphatic hydrocarbons, particularly in the range from ethane to hexane, require only limited oxidation to form the desired intermediate oxidation product and resistance points in the stepwise reactions are not apparent. A different technic is required, oxygen concentration must be low, recirculation must be rapid, and intermediate recovery of products must be employed. Application of high pressure to the oxidation of the aliphatic hydrocarbons results in interesting yields of alcohols, acids and other intermediate oxidation products.

The Oxidation of Paraffin Oil. G. ARDITTE, *Compt. rend.* **195** (1932) pp. 136-7.

Paraffin oil was oxidized by bubbling O_2

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through it at 130°C. in the presence of various catalysts. The metallic catalysts used were powdered and were present to the extent of 0.5% by weight, 0.5% anthraquinone was used, and 1.0% of phenol, aniline, and hexadecane. Copper, nickel, NiO, anthraquinone, and CuO were positive catalysts. Copper was the most active. Aniline, hexadecane, Fe_2O_3, phenol, and water were negative catalysts. Water was most active.

Synthetic Resins from Petroleum Hydrocarbons. C. A. THOMAS and W. H. CAMODY, *Ind. End. Chem.* **24** (1932) pp. 1125-28.

A new synthetic resin having various industrial applications has been produced from highly unsaturated petroleum distillates. The resin is produced by polymerization and condensation of suitable distillates in the presence of aluminum chloride. The reactions involved are complex but the characteristics and yield of the resin can be controlled by regulation of the condition of resin formation. The resin is now being used in the paint, varnish and plastic industries.

The Thermal Decomposition of Methane. LOUIS S. KASSEL, *Jour. Am. Chem. Soc.* **54** (1932) pp. 3949-61.

The thermal decomposition of methane in quartz bulbs at 700-850°C. was studied. The primary reaction is homogeneous and kinetically of the first order. It is probably $CH_4 \rightarrow CH_2 + H_2$ and with a rate constant of $5 \times 10^{13}e^{-79385/RT}$. The observed rate constant is twice this for the next reaction which is considered as $CH_2 + CH_4 \rightarrow C_2H_6$. Hydrogen greatly retards the decomposition of methane. When hydrogen is present in sufficient quantity the reaction rate becomes proportional to $\frac{(CH_4)^2}{(H_2)^3}$. This result is accounted for on the basis of the decomposition of ethane to hydrogen and ethylene, acetylene, and carbon, and that all reactions involved are reversible.

Improved Methods of Examining Mineral Oils, Especially the High-Boiling Components of Non-Aromatic Character. J. C. VLUGTER, H. I. WATERMAN, and H. A. VAN WESTEN, *Jour. Inst. Pet. Tech.* **18** (1932) pp. 735-50.

The estimation of olefins, aromatics, naphthenes, and paraffins is discussed. The use of the specific refraction of Lorenz-Lorenz is recommended and data and charts are given. The use of the aniline point in combination with the specific refraction is discussed and illustrative data are given.

The Knock Rating of Naphthene and Aromatic Hydrocarbons. F. H. GARNER and E. B. EVANS, *Jour. Inst. Pet. Tech.* **18** (1932) pp. 751-78.

The knock ratings at 212°F. and 300°F. jacket temperatures are given for eight hydrocarbons of the cyclohexane series, six hydrocarbons of the cyclopentane series and sixteen hydrocarbons of the aromatic series. In the cyclopentane and cyclohexane series the octane number decreases as the number of carbon atoms in the molecule increases. In the aromatic series the octane number increases up to 9 carbon atoms, and, in general, the octane number of aromatic hydrocarbons is less affected by substitution than that of hydrocarbons of other series. Lovell, Campbell and Boyd's rule that the more centralized or bunched the structure of the molecule holds for all hydrocarbons investigated. For the lower

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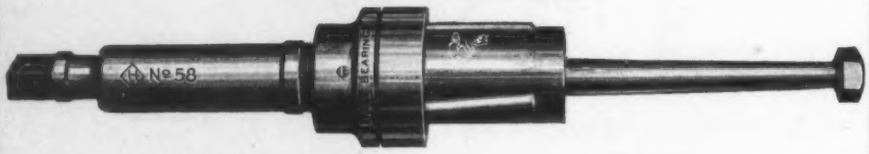

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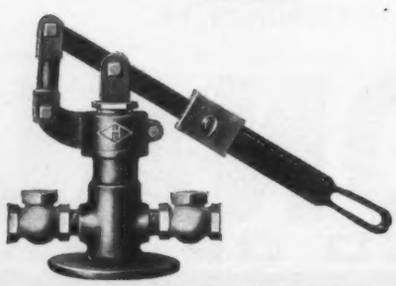

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members of the series the octane number at 300°F. is lower than that at 212°F., but for the higher members the reverse is true. The order of tetraethyl lead susceptibility is aromatics (least), cyclohexanes, cyclopentanes, and α olefines (most). Lead susceptibility increases with molecular weight in each series of hydrocarbons. Lead is more effective at 300°F. than at 212°F. A bibliography of 50 references is appended.

Determination of Paraffin Wax in Crude Petroleum. A. CHMCHEVSKY, *Rev. Petr., Aug. 6, 1932* (487) pp. 982-4.

A modification of the Engler-Holde method is described in which the crude oil is distilled to 250-275°C. under atm. pressure and then further distilled under cathodic vacuum to separate the wax-containing fractions. These fractions are then quantitatively separated into wax and oil by the normal procedure using alcohol and ether at —20°C. The I.P.T. method of using acetone is not suitable for samples prepared in this manner. The author considers his method rapid and accurate and also indicative of the zone of change from crystalline to amorphous wax.

Manufacture: Processes And Plant

Barbet Distillation System for Heavy Oils. Anon. *Rev. Petr., July 23, 1932* (485) p. 910.

The distillation system described is that designed and manufactured by La Societe Barbet, Paris. It is a flashing system using molten lead baths. Two cylinders, half filled with lead, are set horizontally in a conventional furnace setting and constitute the metal baths into which the oil is injected near the bottom. The vapors join and pass to a fractionating column from which streams of benzine, gas oil, and lubricating fractions are taken. The asphaltic residue floats on the surface of the molten lead and is drawn in a suitable manner. The plant operates at atmospheric pressure. It is claimed that no cracking occurs and that an overhead of 90% of the feed can be taken without loss of viscosity of the lubricating distillates.

Facilitating Higher Vacuums in Industrial Processes. D. H. JACKSON, *Chem. & Met. Eng.* **39** (1932) pp. 549-51.

A discussion of the types of vacuum producing equipment best adapted to different ranges of low absolute pressure. The thermo-compressor and its relationship to the production of low vacuum without the use of cold water or refrigeration is reviewed. Applications in the petroleum and fat and oil industries are mentioned.

Exchange Between Vapor and Liquid of Simple Substances. F. BOSNJAKOVIC, *Forsch. Gebiete Ingenieurw. A,* **3** (1932) pp. 135-43.

Condensation and evaporation are mathematically considered and several equations are derived for molecules entering and leaving a liquid surface. Assuming the correctness of the assumptions the temperature of the liquid surface can be determined. Accordingly, steam at 325° condenses at 93.3°. It is assumed that the molecules of the vapor that enter the liquid surface are at 325°. The transfer of heat from superheated, saturated, and wet steam to water is discussed.

The Flow of Gases at High Pressures Through Metal Pipes. D. M. NEWITT and S. K. SIRKAR, *Trans. Institution Chem. Engrs.* **9** (1931) pp. 63-73.

The generalities of the problem are discussed and reference made to such information as is available. To extend knowledge in this field the

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flow of air, nitrogen carbon dioxide, and argon in steel and copper pipes, and over the pressure range from 1 to 277 atmospheres, was investigated. The properties of the gases at high pressures, particularly viscosity, are carefully considered. The results in measurements of coefficients of resistance are discussed in relation to surface roughness. The existence of three distinct types of flow as postulated by Davis and White has been extended to the flow of gases in pipes of small diameter.

Method for Determining the Most Favorable Design of Gas Burners. J. H. EISEMAN, E. R. WEAVER and F. A. SMITH, *Bur. Stds. Jour. Res.* **8** (1932) pp. 669-709.

The conditions that limit the satisfactory operation of a gas burner in relation to the appliance are discussed. Definite limits can be determined under which flames flash back, blow from the parts of the burner, or burn luminously and incompletely. Laboratory apparatus and methods developed and used are described in an appendix.

Products: Properties, Utilization and Testing

Knocking in Internal-Combustion Engines. K. SCHNAUFFER, *Fuel* **11** (1932) p. 298.

The rate of flame spread and pressure development in a single cylinder engine was studied. The cylinder head was equipped with four spark plugs, one for ignition and three to register the arrival of the flame at successive points across the combustion space, through the medium of a current surge resulting from ionization and registered on an oscilloscope. In a non-knocking explosion the flame travels at uniform speed. When a knock occurs the unburnt charge ahead of the flame ignites simultaneously throughout, thus causing a sudden large increase in temperature and pressure. In a knocking explosion the energy liberation is so rapid that large local pressure differences are established that equalize with the velocity of sound. The intensity of knocking depends on the amount of residual charge that spontaneously ignites and on the air-fuel ratio. In a non-knocking explosion a uniform pressure prevails and there is after-burning until the exhaust valve opens. In a knocking explosion there is little or no after-burning.

Chemical and Physical Properties of Petroleum Spray Oils. J. R. GREEN. *J. Agric. Research* **44** (1932) pp. 773-87.

Injury to plants by petroleum oils is associated with high sulfonatable component content, sulfur content, bromine absorption, acidity, and ease of emulsification with water. No relationship exists between injurious properties and flash and fire points, viscosity, or gravity. A laboratory method for measuring probable injury to foliage was developed and is based on the effect of the oils on barley seedlings. Oils containing less than 6% sulfonatable material will not form a film on a water surface and are least injurious.

Olive Oil as Lubricant for Automobiles. M. BOUCHER, *Olii. Min.* **12** (1932) pp. 105-6.

Tests were made to determine the merits of olive oil as a lubricant. It has a high flash-point and a flat viscosity-temperature curve. Owing to the content of oxygen, carbon formation on combustion is small. Comparative tests made with mineral and olive oils, using an 8 H.P. Renault car, showed that the use of olive oil resulted in increased power, cooler engine, and no hard carbon deposits.

Oil for Wool, Rayon, Silk and Cotton. W. F. VICKERS, *Trans. Institution of Chem. Engrs.* **9** (1932) pp. 86-9.

From being an haphazard undertaking the manufacture of suitable wool lubricants has become a more exact science. The problems involved in oiling wool, rayon, silk and cotton, and oils suitable for the various purposes, are discussed. Pure mineral oils are difficult to deal with in scouring, and unless highly refined, oxidize on storage producing brownish indelible stains. Modern practice favors the use of compounded oils made of highly refined mineral oils and neutral fatty oils. Such oils are far easier to remove from the cloth and do not stain upon exposure.

Changes in Mineral and Electrical Properties of a Mineral Insulating Oil Heated in Contact with Air. H. H. RACE, *J. Phys. Chem.* **36** (1932) p. 1928.

Oxidation causes a marked increase of spreading on water, but the corresponding increases in acidity are small. The value of the oil-spreading measurement is emphasized. Oxidation increases the high frequency dielectric losses, but does not change the frequency at which maximum loss occurs. Debye's theory of polar molecules is discussed.

Determination of Gum in Gasoline. M. J. MULLIGAN, W. G. LOVELL, and T. A. BOYD, *Ind. Eng. Chem., Anal. Ed.*, **4** (1932) pp. 351-6.

A simple and rapid method for determination of the gum in gasoline has been devised. The method is intended to simulate in some degree the conditions of gum formation in the intake system of an automobile engine, and is essentially a high-temperature modification of the conventional air-jet method. The gasoline is evaporated from a beaker by heated air at 200°C. The time required to secure a gum of substantially constant weight from 50 ml. of gasoline is 20-25 minutes. Oxidation is not serious and results are reproducible. Comparative data secured by this and other methods are given.

Detection and Determination of Free Sulfur in Petroleum Distillates. M. K. THORNTON and J. E. LATTA, *Ind. Eng. Chem., Anal. Ed.* **4** (1932) pp. 441-2.

The Halphen method for the detection of cottonseed oil requires sulfur as one of the reagents. A modification of this reaction was applied to the detection and determination of sulfur. The measurement is a colorometric one. Sulfur compounds do not interfere. The results check well with those of the lamp method.

Natural Gasoline

Chemical Utilization of Methane. C. PADOVANI, *Proc. 3rd. Intern. Conf. Bit. Coal* **1** (1932) pp. 910-27.

Thermal treatment of methane at 1000-1300° without pressure or catalysts yields finely divided carbon, light liquid mainly aromatic hydrocarbons, and hydrogen. The physical and technical properties of the blacks can be altered by controlling operating conditions. Yields of over 50% of the highest grades of lamp black that can be activated are possible. One cubic meter of gas (98% methane), without recirculation, yielded: lampblacks 200 g., aromatic oil (90% benzene) 33-35 g., and gas (2/3 H_2 and 1/3 CH_4) 1.4 cu. meters. Data are given also for a coke oven gas.

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THE MONTH IN REVIEW

New Jersey Standard Forms Alcohol Company

STANDARD Alcohol Company has been formed as a separate unit by Standard Oil Company of New Jersey, which has been producing alcohol from petroleum for the past 12 years. The company has sold its business to the newly formed organization.

The move was made in pursuance of an agreement ending litigation between Standard Oil Company of New Jersey and Petroleum Chemical Corporation, on patents controlling manufacture of petroleum alcohols, which has been under way in federal courts in Delaware and New Jersey. Petroleum Chemical Corporation, which is controlled by Barnsdall Corporation and National Distillers Products Corporation, has taken a substantial stock interest in Standard Alcohol Company, and is to have permanent representation on its directorate.

Petroleum Chemical Corporation and Barnsdall Corporation for several years have had a semi-commercial alcohol plant at the Barnsdall, Oklahoma, refinery of Barnsdall Refineries, Inc., and for a time planned erection of an alcohol plant at Toledo, Ohio, which plans for the time being will not be carried out. Standard Oil Company of New Jersey has been producing alcohol at its New Jersey refineries.

Officials of Standard Alcohol Company are F. H. Bedford, Jr., president (also a director of the Standard Oil Company of New Jersey), F. W. Abrams and M. B. Hopkins, vice presidents. The directorate includes the officers and Thomas F. Brown, Frank A. Howard, N. E. Loomis, William Dewey Loucks, George W. McKnight, Seton Porter (president of National Distillers Corporation), and E. B. Reeser (president of the Barnsdall Corporation). The New York office of Standard Alcohol Company will be at 2 Park Avenue.

Change in Knock Test Method Postponed

INSTEAD of January 1, 1933, as originally proposed, the effective date of the Cooperative Fuel Research test method for determining the octane number of motor fuel has been postponed to April 1, 1933. The action followed a recommendation by the Detonation Sub-committee in response to complaints that it would require more time to obtain new equipment and to correlate the new method with plant operation.

INSTITUTE RETURNS TO CHICAGO FOR 1933 ANNUAL MEETING

The Executive Committee of the Board of Directors of the American Petroleum Institute decided at the close of the thirteenth annual meeting in Houston to return to Chicago and the Stevens Hotel for the 1933 meeting.

Meeting dates have been arranged in order that those attending the Institute's annual meeting can also observe the World Fair. The A. P. I. meeting is scheduled for October, 24, 25 and 26.

East Texas Has Record Assortment of Refineries

A SURPLUS of high gravity crude at bargain prices in the East Texas field has attracted the greatest number of refineries and skimming plants ever concentrated in a single area. Including five plants now under construction, there are 29 within the field proper, or situated within sight of the derricks over producing wells, and more plants are proposed. The combined capacity of these plants is 86,250 barrels, but monthly operations have never averaged more than 50 per cent of the rated capacity since the field became a major refining center. Quotations on refined products emanating from these plants virtually dictate the price market on spot sales in the Southeast and Middlewest, as the plant owners have ready access to a greater volume of fresh crude at "buyers' prices" than any other refining center.

An accurate check on crude charges to stills is impossible, as some of the plants provide markets for illicit oil, and do not incorporate same in reporting on plant activities. Crude deliveries to these plants for the week ending November 9 was estimated at about 30,000 barrels daily.

Sinclair Refining Company is the only major unit operating a refinery in the district, and is also the only plant owner known to be buying the top posted price of $1.12 per barrel for local crude. The price offers of the other plants range downward from 98 cents to 35 cents per barrel.

Tank trucks provide the market outlet for the bulk of the gasoline and kerosene manufactured by the small skimming plants, and for this reason a number did not go to the trouble to locate near railroad facilities. There are eight plants completed and building within and near the town of Gladewater, located in the northwest portion of the field.

Refineries in East Texas District

Company and address—	Daily Capacity	Plant Locations	Railroad Connection
Alamo Refining Co. (was Slack) Tyler...	2,500	Camps Switch	T&P
Arrow Refining Co., Overton.....	2,500	Overton	I&GN
Beacon Oil & Refining Co., Henderson..	4,000	NW Henderson	I&GN
Boone Refining Co., Arp.....	1,000	Arp	I&GN
Central Refining Co., (inactive).....	10,000	Friar	I&GN
Constantin Refining Co., Overton.....	2,500	Overton	I&GN
R. X. Cook, Gladewater.....	500	Gladewater	T&P
East Texas Refining Co., Dallas.....	12,000	Longview Junc't	Santa Fe
East Texas Refining Co., Dallas.....	6,000	Friar	I&GN
Gaso Refining Co.	250*		....
Gladetex Refining Co., Gladewater.....	750	Gladewater	T&P
Gladewater Refining Co., Gladewater....	1,500	Gladewater	T&P
Gregg Refining Co., Gladewater.....	300*	Gladewater	....
H. & M. Refining Co., Gladewater.....	300	Gladewater	....
Jacksonville Refining Co.	250	Omega	....
Kilgore Refining Co., Overton	1,500	Kilgore	I&GN
Lake Refining Co., Gladewater.....	250	Gladewater	....
Overton Refining Co., Overton.....	3,500	Overton	I&GN
Pennant Refining Co., Kilgore	400*	Kilgore	I&GN
Pet. Refractionating Corp., Ft. Worth...	10,000	Bodie	I&GN
Roland Refining Co., Arp.	250*	Arp	I&GN
Rusk Ref. Co. (was Diamond), Overton..	3,000	Overton	I&GN
Sinclair Refining Co., Fort Worth.....	3,500	E of Gladewater	T&P
Southern Oil Refining Co., Tyler.....	1,000	Reeds Switch	I&GN
Taylor Refining Co., Tyler.....	15,000	Tyler	Cotton Belt
Unit Ref. Co. (was Guillory), Kilgore .	250	Kilgore	I&GN
V. O. E. Refining Co. (was Mackey), Gladewater	1,000	Gladewater	T&P
V. O. E. Refining Co., Gladewater.....	2,000*	Big Sandy	Cotton Belt
Woodland Refining Co. (was Cooper-Potter), Kilgore	250	Kilgore	I&GN

*Building.

Butane-Propane Handbook Published

EARLY in November, Western Gas brought from the press the first edition of the "Handbook of Butane-Propane Gases," which has been under preparation for the past several months. Contents of the volume deal with both general and technical phases of the liquefied petroleum gas industry in its several departments—production, transportation, distribution, utilization. Particular interest attaches to the publication due to its being the first compilation of reference data pertaining to this industry.

The first edition of the handbook represents the joint effort of a score or more individuals directly associated with butane-propane enterprises. Its range of subject matter, covering the industry in a most thorough manner, is handled in 12 chapters.

In addition the handbook presents a catalog section giving detailed information on products designed for butane-propane service, a buyer's guide, listing firms supplying equipment, appliances or services for the industry; a directory of central plants enumerating the operating town plants distributing piped butane-propane gases; a complete bibliography covering the literature on liquefied petroleum gases, and a detailed subject index to the contents of the book. Copies of the handbook on Butane-Propane Gases can be secured from The Gulf Publishing Company, Houston, Texas. Price $5.00.

Measurement of Oil in Bulk

MEASUREMENT of Oil in Bulk, Part 1, Standard Weights and Measures," has been published by the Institution of Petroleum Technologists, and in addition to editorial treatment of the problems of oil measurement presents tabular matter having to do with inter-relation of units and recommended contracted ratios for general use in the petroleum industry. The Measurement of Oil in Bulk Committee of the institution has had the cooperation of the Standards Department of the Board of Trade, of the National Physical Laboratory, of the United States Bureau of Standards and of the International Bureau of Weights and Measures. The work was done because of the existing confusion on the subject and the apparent urgent need for an authoritative publication on the subject of the various national units generally used in the industry. The book can be secured from the Institution at Aldine House, Bedford Street, London, W. C. 2. Price 2s. 6d.

C. B. AMES
President American Petroleum Institute.

CHARLES BISMARCK AMES, elected president of the American Petroleum Institute at its thirteenth annual meeting, Houston, Texas, November 16, 1932, is the seventh to take office as chief executive of the petroleum industry's largest trade association.

He was born August 1, 1870, at Macon, Mississippi, the son of Charles Bingle and Sarah Jane Longstreet Ames. He was graduated by Emory and Henry College in 1890, with the degree bachelor of science, and received the degree bachelor of laws from the University of Mississippi in 1892.

After practicing law at Macon from 1893 to 1899, he moved to Oklahoma City, Oklahoma, to continue his practice. He was presiding judge of Division One, Supreme Circuit Commission of Oklahoma, from 1911 until March 1, 1913.

During the World War, he was a member of the Oklahoma State Council of Defense, Federal Food Administrator for Oklahoma, and chairman of the Oklahoma City Liberty Loan Committee. He became assistant to the attorney general of the United States in June, 1919, resigning in September, 1920, to resume practice at Oklahoma City. He was general counsel for The Texas Company, from 1920 to 1925, and has been a director and vice president of that company since January 1, 1928.

President Ames was a delegate to the Universal Congress of Lawyers and Jurists held at St. Louis, in 1904. He represented the Methodist Episcopa Church, South, at the Ecumenical Methodist Conferecne at Toronto, Canada, in 1911, and at London, England, in 1921. In 1916 he was president of the Oklahoma State Bar Association.

He was married to Elizabeth P. Allen, of Macon, in February, 1894.

1933 Annual Meet Of W. P. R. A.

THE board of directors of the Western Petroleum Refiners Association met at Houston recently and voted to hold its 1933 annual meeting at the Arlington Hotel, Hot Springs, Arkansas, on April 5 and 6.

The president appointed the program committee consisting of P. M. Miskell, Empire Oil & Refining Company, Tulsa; R. R. Irwin, White Eagle Oil Corporation, Kansas City, and H. T. Ashton, Lubrite Refining Corporation, St. Louis. This committee is now at work arranging for an interesting program.

Correction

IN the article, "Improvements in Solvent Refining of Lubricating Oils By the Edeleanu Process," by Dr. Walter Kain, appearing in The Refiner, November, 1932, page 553-557, the following typographical errors occurred. On page 553, fourth paragraph, the sentence reading, "The treatment of transformer stocks is carried out preferably in such a manner that the Edeleanu raffinates are obtained." This should read "The treatment of transformer stocks is carried out preferably in such a manner that the Edeleanu raffinates are *after treated with alkali and/or clay, whereby finished products with a life test of forty days or more* are obtained."

On page 557, first paragraph, the sentence reading "If the proportion of benzol is unduly high, the selectivity of the solvent mixture will *increase,*" should read "If the proportion of benzol is unduly high, the selectivity of the solvent mixture will *decrease.*"

New Book on Temperature Measurement and Control

TEMPERATURE Measurement and Control," part two of The Manual of Instrumentation, by M. F. Behar, has been published by Instruments Publishing Company, Pittsburgh, and can be secured from The Gulf Publishing Company. Price $4.00. This book consists, in addition to part two of the manual relating to temperature measurement and control, part three of the manual, this dealing with humidity measurement and control. The book is actually composed of four handbooks on the following subjects: thermometry, pyrometry, automatic control of temperature, and humidity control and measurement. Some indication of the value of the work is shown in the chapter headings, as follows: Temperature Control, Indicating Thermometers, Thermoelectric Thermometers, Radiation and

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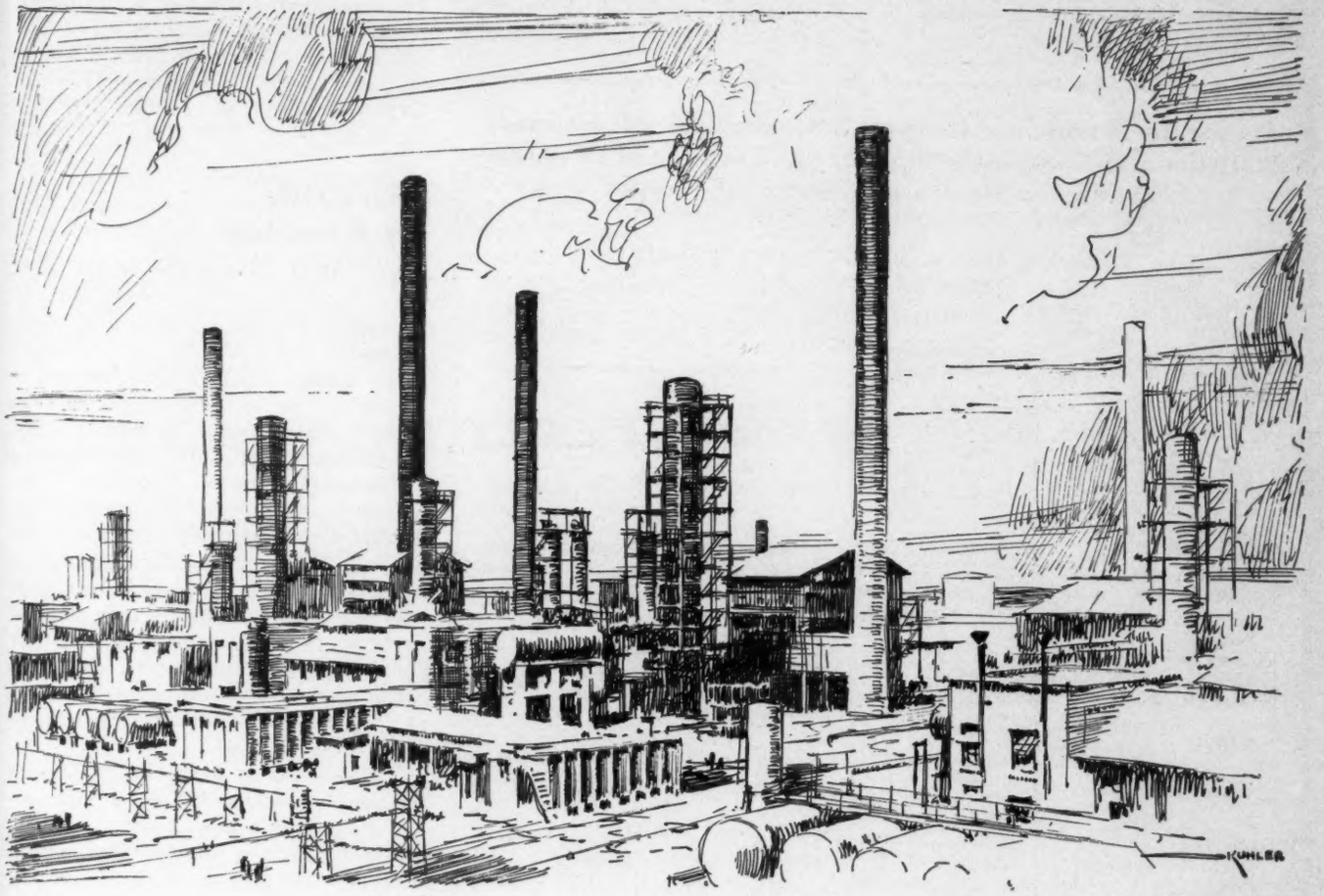

Intelligent research toward simplifying design has resulted in the coordinating of individual processing steps with a consequent reduction in equipment, land and buildings. The result has not only reduced plant investment and fixed charges, but through a greater production and saving of heat has reduced the cost per gallon of gasoline produced.

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Optical Pyrometers, Pyrometric Cones, etc., Temperature Recorders, Automatic Temperature Control, and Temperature Control Instruments and Accessories. The book is well illustrated with both drawings and photographs. It will prove of real value to those engaged in design, installation and maintenance of control and regulatory equipment.

This book follows publication of Part 1, of the Manual, price $2.00, under the title "Fundamental Principles of Instrumentation," by the same author.

Bids Raised For Richfield

SUBSEQUENT to the recent action by Standard Oil Company of California in matching the preceding offer of Consolidated Oil Corporation for acquisition of the Richfield Oil Company of California, operating now in receivership, the Consolidated Oil Corporation increased its bid by $4,900,000.

The last Standard Oil Company of California offer was the equivalent of $22,500,000. Of this, $17,500,000 was in the form of five per cent debentures of a new Richfield Oil Company,and 200,000 shares of Standard Oil Company of California stock, worth around $25 per share, and $5,000,000 to pay non-participating, unsecured creditors and bondholders, in return for which Standard Oil Company would withdraw debentures in an equivalent amount.

The Sinclair group responded by offering 6 per cent debentures, $25,000,000, to mature in 20 years, 400,000 shares of Consolidated Oil Corporation common stock and cash up to $10,000,000 for non-participating, unsecured creditors and bond holders.

American Petroleum Institute's Committee of Refinery Statistics and Economics Summary of Forecast of Demand, Economic Stocks and Required Supply

October 1, 1932 to March 31, 1933 (Forecast)
vs.
October 1, 1931 to March 31, 1932 (Actual)
(Thousands of Barrels)

MOTOR FUEL

(Details Table II)

ITEM	LAST QUARTER 1932 Total	LAST QUARTER 1932 % Change	FIRST QUARTER 1933 Total	FIRST QUARTER 1933 % Change	SIX MONTHS Total	SIX MONTHS % Change
Demand						
Total	94,000	—12.7	80,800	—10.6	174,800	—11.7
Domestic	87,500	—10.6	74,500	— 8.2	162,000	— 9.5
Exports	6,500	—34.1	6,300	—31.6	12,800	—32.9
Stocks						
Change During Period	—750		+6,090		+5,340	
Beginning of Period	51,420		50,670		51,420	
End of Period	50,670		56,760		56,760	
Supply						
Total	93,250	—18.0	86,890	—14.9	180,140	—16.5
From Imports	400	—84.2	100	—97.2	500	—91.7
From U.S. Producers	92,850	—16.5	86,790	—11.9	179,640	—14.3
Straight-run	44,310	—18.6	41,220	—14.3	85,530	—16.5
Cracked	40,090	—13.0	37,300	— 8.9	77,390	—10.6
Natural Gasoline	8,170	—21.0	7,980	—16.7	16,150	—19.0
Benzol	280	—27.8	290	—20.3	570	—24.2
CRUDE OIL						
Demand						
Total	198,460	—14.5	185,090	— 9.9	383,550	—12.3
Export	6,250	+ 5.8	5,750	+ 4.2	12,000	+ 5.0
Domestic	192,210	—15.0	179,340	—10.3	371,550	—12.8
Runs to Stills	188,010	—14.2	175,140	—11.9	363,150	—13.4
Used as Such	3,000	—47.8	3,000		6,000	+15.2
Transfer to Fuel (California)	1,200		1,200	—22.4	2,400	+63.5
Stocks						
Beginning of Period	353,750					
End of Period						
Supply						
Total	198,460	—14.5	185,090	— 9.9	383,550	—12.3
From Imports	5,400	—55.1	5,400	—52.9	10,800	—54.0
From Domestic Prod.						
From Stocks	193,060	—12.2	179,690	— 7.3	372,750	— 9.9
Daily Average Domestic Crude Oil Requirements (From Production and Stocks)	2,098	—12.2	1,997	— 7.3	2,048	— 9.9

NOTE:—Percent change calculated on daily average basis due to February, 1932, having 29 days.

Black Oils Of Wyoming

DETAILED information on the high-sulfur crude oils (black oils) of Wyoming is given in Bureau of Mines Technical Paper 538, "A Survey of the High Sulfur Crude Oils Produced in Wyoming," (to be secured from Superintendent of Documents, Government Printing Office, Washington. Price 10 cents.)

The survey indicates that most of the gasoline and naphtha fractions of the Wyoming black oils, which constitute the portion of the oil used for manufacture of motor fuel, are deficient in light ends and have a sulfur content greater than 0.1 per cent, and will require blending with light material in order to meet distillation requirements. Desulfurization treatment is required to meet the sulfur specifications for motor fuel.

The oils can be made to yield more gasoline by cracking, but due to high sulfur and carbon residue content, cracking offers difficulties of operation which make it necessary to design especially adapted equipment.

The survey indicates that the black oils contain greater amounts of lubricating oil stocks than many of the well known lubricating oil crudes, but the lubricating oil stocks made from these black oils will require extensive and expensive treatment due to their high sulfur and asphaltic content.

Gasoline Still Apart As Tax Source

ONCE used, always a favorite. Such is gasoline to the tax gatherer.

Witness the recommendations of Herbert Hoover, president of these United States until March 4, 1933. His recommendation to Congress was that a sales tax be substituted for the crazy quilt of excise taxes by which effort was made no longer back than last summer to balance the budget of these United States.

There is an exception, which is gasoline. That commodity would not come

under the sales tax of 2¼ per cent. The tax on motor fuel would remain as it is, one cent a gallon as its contribution toward keeping the federal budget in balance.

The irony of it all is that gasoline came into this last tax melee as a last resort and for one year. The inference was that gasoline should not be taxed by the federal government and since it was being penalized unjustly it should suffer the penalty but one year.

But gasoline produced too well. While other commodities have failed to deliver the revenue as calculated by Ogden Mills and his treasury experts, gasoline has contributed more revenue than these men anticipated.

Now it comes about that the attitude toward gasoline has changed. Only a few months back the attitude of official Washington was that gasoline should be used temporarily. Since it can pull more than its share of the load, the present attitude is that it shall be left in harness over a long period, while other commodities are removed as special draft animals and a general tax assessed.

Fortunately the recommendations of the president have not been manufactured into law. There is still time for the petroleum industry to be heard. There is still time for the public to be heard, provided means can be devised whereby the voice of the public may reach the ears of official Washington.

Some believe that no change in the tax laws will be made at this session of Congress. But changes will be made later if not prior to March 4. The federal budget is not balanced. There may be some help through economy. But the greater part of needed funds will come through additional or changed tax sources. Whatever the change, gasoline seems fated for the role of pulling more than its share of the load.

The petroleum industry must continue its fight for lower taxes, hampered the while by unjust taxes.

▼ PLANT ACTIVITIES ▼

Expansion: Standard Oil Company of California has announced that it will spend $3,000,000 improving its West Coast refineries and properties, money to be spent with West Coast equipment concerns.

Operating: Wasatch Oil Refining Company, Salt Lake City, with plant eight miles north of the city at Woods Cross, is operating its low pressure vapor phase cracking process, capacity 1000 barrels daily, on crude from Panhandle Texas, fields. W. H. McIntire, Jr., president of the company.

Gasoline Line: White Eagle Oil Corporation is studying costs and construction data relating to six-inch gasoline pipe line from Augusta, Kansas, refinery to Kansas City, and further plans involve a line to St. Louis to Lubrite Refining Company refinery there. Both companies are units of the Socony-Vacuum Corporation. Indefinite maturity.

Refinery: Continental Oil Company may build refinery between Shoshoni and Bonneville on a proposed line from Maverick Springs field to a railhead either at Shoshoni or Riverton, Wyoming. Indefinite maturity.

Refinery: Monarch Refining Company, Los Angeles, Charles W. Fouri, president, announced plans for a small refinery and cracking plant and marine terminal at Long Beach, California. Reported proposed expenditure, $500,000.

Gasoline Line: Pure Oil Company and Sun Oil Company building 80-mile gasoline pipe line, Toledo, Ohio, to Detroit, Michigan, connecting refineries of both companies to shipping terminal at Hamtranck, Michigan. Reported cost $500,000.

Cracking: Hancock Oil Company, Long Beach, California, refinery, announced intention of doubling cracking capacity.

Stabilizer: Wilshire Oil Company at Vernon, California refinery, has about completed installation of a new stabilization unit (Foster Wheeler contract), and is reported planning addition of cracking facilities.

Electric Plant: Phillips Petroleum Company, Okmulgee, Oklahoma, installing electric generation plant, three Diesel engines, one story structure, contract to Manhattan Construction Company, to furnish power for plant operation.

Operating: Altitude Petroleum Corporation, completed reconditioning leased refinery at Kansas City; Soars & Lovelace contract, Dr. Sidney Born, consultant. Work included new piping, three 50-foot bubble towers, continuous treating system and other auxiliaries. E. S. Hopper, superintendent; F. O. Wickstrom, assistant treasurer and office manager; G. L. Shepard, experimental chemist; C. H. Warner, secretary and in charge of marketing; E. E. Roper, division manager. (Refiner, Nov., 1932, page 58A.).

Expansion: Imperial Oil Company, Ltd., at its refinery at Vancouver, B. C., is reported in Petroleum World, London, as planning expenditure of $1,000,000 for new equipment and processes.

Lease Refinery: Dixon Creek Oil & Refining Company, Amarillo, will lease Kings Mill, Texas, refinery to Kings Mill Refining Company following sale of producing properties to The King Royalty Company, Wichita Falls.

Refinery: Orchard Oil Company, Oregon Basin field, Wyoming, operators, announced plans for erection of skimming plant in the field.

Sold: Terra Bella Refining Company, Terra Bella, California, has been purchased by David Revley and J. E. Hirsch, Los Angeles, who will operate.

Rehabilitation: Cosden Oil Company, Big Springs, Texas, refinery, will spend $300,000 for improvements in plant and producing properties, receiver having secured authorization for such work.

Negotiating: Barnsdall Corporation is reported negotiating for purchase of Lion Oil Refining Company, El Dorado, Ark. Lion operates a 20,000 barrels refinery, with cracking facilities and has producing properties in Arkansas, Louisiana and Texas.

Power Plant: Pure Oil Company, Muskogee, Oklahoma, refinery, erecting plant for generation of electricity for power purposes, to be completed by first of next year.

Cracking: Trinidad Leaseholds, Ltd., is enlarging Trinidad refinery through installation of new cracking facilities, Dubbs type, 400 pound pressure operation, reaction chamber 72 inch by 48 feet, said to be the world's largest single-piece hollow forging, made by Thomas Firth & John Brown, Ltd.

Refinery: The V. O. E. Refining Company, operating 5000-barrel plant at Gladewater, Texas, plans erection of second plan at Big Sandy, Texas, 2000 barrels capacity, upon completion of 12 miles of four-inch pipe line from west Gregg County, East Texas field.

Refinery: Tidal Refining Company, through Tidal Oil Company, producing affiliate, has entered Conroe, Texas field, as purchaser of crude oil, after its producing organization purchased production in the area, and revived rumors that the company will again consider erection of a Houston refinery on land owned opposite the plant of Shell Petroleum Corporation at Deer Park.

Reclamation Unit: Pure Oil Company, Midland, Michigan plant, constructing copper oxide reclamation unit, supervision of A. W. Michener, Wm. C. Dickerman, Jr., in charge of operation of this department.

Gasoline Plant: Midland Gasoline Corporation, Fort Worth, is moving its Coleman, Texas, absorption gasoline plant equipment to Conroe, Texas, Ereco type equipment, 20,000,000 cubic feet capacity, not moving compression facilities at this time. (Refiner, November, 1932, page 58A.)

Refiner: Richmond Petroleum Company (subsidiary of Standard Oil Company of California) completing plans for refinery across the bay from Puerto, Mexico, maturity after completion of establishing validity of titles.

Acquisition: Sunshine Refining Corporation formed at Hutchinson, Kansas, plans modernizing and operating Hutchinson Oil Refining Company plant, 3000 barrels capacity, one Trumble cracking unit, idle for several years.

Expansion: Associated Oil Company, Los Angeles, has announced plans to spend $6,000,000 during 1933 for general improvements in its refineries, automotive, marine, and distributing departments.

Resumes: Hayton Refineries, Ltd., London, England, which acquired Killingholme refinery (Gyro cracking installation) of Petroleum Refineries, Ltd., plans resuming operations.

Refinery: W. L. Clay and E. E. Peveto, building small skimming plant, Rock Island right-of-way, near Seminole, Oklahoma.

If . . . you are keeping an EYE ON COSTS

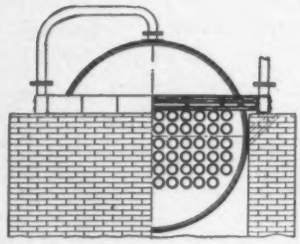
Marley steam superheater for H.R.T. boilers with cover removed.

ECONOMIZE by modernizing your H.R.T. boilers with Marley steam superheaters. Marley superheaters supply the moderate superheat best suited to most efficient H.R.T. boiler operation. They require no changes in steam fittings or lubricating oils. They can be used with any kind of fuel. They eliminate arch troubles by acting as the rear arch. They are easy to install, moderate in first cost and soon pay for themselves in savings effected.

If your plant is equipped with H.R.T. boilers you can save money by installing Marley superheaters. Write for Catalog No. 23.

Save with Superheat

Substantial savings always accompany a change from saturated to superheated steam. Boiler capacities are increased. Lubricating costs are reduced. Troubles due to wet steam and condensation loss are eliminated. Fuel savings as high as twenty per cent are not at all unusual with superheated steam and boiler efficiency is greatly increased.



Section and end view showing Marley superheater installed.

THE MARLEY COMPANY
1737 WALNUT KANSAS CITY, MO.

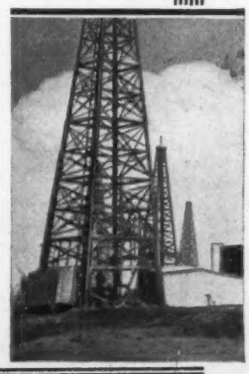
MARLEY
STEAM SUPERHEATERS
FOR H. R. T. BOILERS

"Just Any Old Steel" Won't Do

Operating our own Open Hearth Furnaces, Rolling Mills, Forge and Machine Shops — every operation is Harrisburg controlled. This production efficiency and economy is reflected in the quality and value of Harrisburg products.

■ **Oil Field Products Require Special Steels** Almost any layman knows that the equipment used in the oil fields must be made of different steels than that used in—let's say—the coal fields. "Just any steel" will not do. The metallurgy involved in the manufacture of petroleum handling equipment has its own distinct problems and requirements.

■ **Harrisburg Makes Its Own Special Steels for Making Its Oil Field Products . . .** As one of the oldest and largest manufacturers of petroleum handling equipment in the nation, "Harrisburg" has been a pioneer in the designing of oil field equipment. We early "ran into" the metallurgical problems involved. Since for many years we have made our own alloy steels, we have been in a position to do the great amount of research work necessary to solve these problems. Accordingly, Harrisburg oil field equipment is not only designed by experts of long standing in the industry, but it is fabricated from our own steels, especially made for petroleum handling. Harrisburg equipment is right—clear through.



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General Sales Agents

W. P. Paul Company.....Drexel Bldg., Philadelphia
W. R. McDonough Co.....National Bldg., Cleveland
S. C. Mead.....160 N. La Salle St., Chicago
Mid-Continent Supply Co.....Fort Worth, Texas

Cylinder Sales Agents

Joseph A. Janney, Jr.....Morris Bldg., Philadelphia
Charles L. Gulick.....110 E. 42nd St., New York
A. W. V. Johnson...Merchants Exchange Bldg., San Francisco
The Corbett Corp.....Sawyer & Winter Sts., Houston

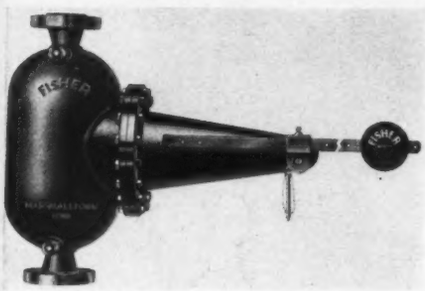
New Equipment for the Modern Plant

1. Liquid Level Controller Float Cage

FISHER GOVERNOR COMPANY

Fisher Governor Company, Marshalltown, Iowa, announces the drawn steel float cage, for use where a float outside the tank or tower is required to operate a lever valve, pilot valve, indicator device, or switching mechanism.

This cage is made of open hearth flange quality steel of a tensile strength of 65,000 pounds per square inch. The nipple on the cage body, as well as the drop forge steel flanges on top and bottom of cage, are made an integral part of the unit by welding.



Fisher Float Cage

There is a bolted flange of high pressure boiler plate material between the cage body and arm, permitting removal or inspection of the float without removing the cage from the tank or tower.

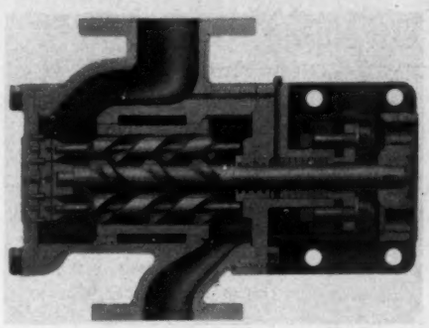
The drawn steel cage is suitable for high pressures and temperatures: 610 pounds at 600° F., or 410 pounds at 900° F. It is equipped with ball bearing, grease seal stuffing box, and KA-2 stainless steel ball float. Top and bottom equalizing connections are drop forged steel flanges. Wall thickness is uniform.

2. Rotary Displacement Pump

DELAVAL STEAM TURBINE CO.

DeLaval Steam Turbine Company, Trenton, New Jersey, announces a type of rotary displacement pump which embodies a number of radically new features.

Power is applied to a central or power rotor, which meshes with one or more sealing rotors of such form that they are propelled largely by fluid pressure, with a minimum of mechanical contact. This action results from the ingenious shape of the threads, those of the power rotor being convex, while those of the idler rotor are concave. This tooth form, which is patented, accomplishes sealing so effectively that numerous turns of the thread around the rotor are not required in order to keep slippage to a small value.



Axial Section of DeLaval-Imo Rotary Displacement Pump

Efficiencies of 80 per cent to 90 per cent have been obtained on independent impartial tests, according to the manufacturer.

The velocity of the liquid through the pump is low and there is no trapping or cutting off of liquid in tooth pockets. Because of this, and the fact that there is nothing in the mechanical construction to limit the operating speed, the pump operates successfully and quietly at the higher motor speeds, and even at turbine speeds.

There are only three moving parts, and except for small thrust buttons to maintain the relative axial positions of the rotors, no separate bearings are used, nor are pilot gears required. Only one stuffing box is necessary.

These pumps are known as "DeLaval-IMO" pumps. They are available in capacities ranging from one-half to 700 gallons per minute, and for pressures up to 500 pounds per square inch. Pumps for higher pressures and capacities can be supplied.

3. Portable Electric Cord

THE OKONITE COMPANY

The Okonite Company, Passaic, New Jersey, announces a line of portable cords and cables having a special outer sheath which it claims is impervious to the destructive action of oil or grease. The new line of cords is trade-marked "Oilproof Okocord."

4. Motorized Speed Reducers

THE LOUIS ALLIS COMPANY

The Louis Allis Company, Milwaukee, Wisconsin, announces motorized speed reducers of high efficiency, capable of employing nearly any type of motor.

The motor and speed reducer are combined into a single, compact, self-contained unit which makes an easily-mounted, slow-speed drive for many types of industrial machinery. Ratings available are from three-fourths to 75 horsepower with output speeds four to 400 revolutions per minute.

Louis Allis Speed Reducer

Efficiencies as high as 97% or more are made possible by simple design which reduces to a minimum the number of rotating and wearing parts, according to the manufacturers.

These units can be furnished with motor characteristics and style of mounting best suited to each application. The integral style in which the end bell is removed and the motor close-coupled to the gear casing, is most common where an open motor or enclosed non-ventilated motor is employed. The flexible style, in which the entire motor without any change is mounted on the gear casing, is furnished where conditions require an explosion-proof, enclosed fan-cooled, splash-proof, or other protected type of motor. Either style can be furnished to provide normal starting torque, high

— — — — — — — — *MAIL COUPON* — — — — — — — —

REFINER AND NATURAL GASOLINE MANUFACTURER,
Houston, Texas, U. S. A.

Please see that I am supplied, without obligation, additional information on New Equipment Items Nos. . . . . described in December, 1932, issue of REFINER.

Name . . . . . .

Company . . . . . .

Address . . . . . .

Hy-Speed ELECTRIC MIXERS

For Mixing:
Lubricating Oils
•
Lime and Oil
•
Fuller's Earth and Oil
•
All Liquid Chemicals

***"Hy-Speed"* Portable Electric Mixers blend, compound, mix or agitate all oils and liquid chemicals . . . better and more economically.**

They clamp to any tank or vat . . . require no installation. Capacities from 5 to 50,000 gallons.

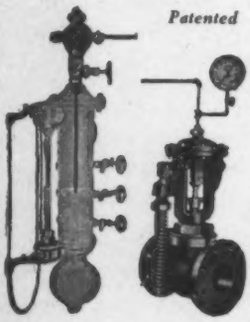
Write for your copy of our new catalog today!

ALSOP ENGINEERING CORP.
39 West 60th Street, New York City

The ONLY Boiler Feed Regulator That Is Truly Power Operated . . . The CAMPBELL

The steam that operates the Control Valve comes directly from the boiler. Unlimited power. "Sticking" is impossible. And in the regulating element there are no moving parts. No floats. No thermostats. No generators. No stuffing boxes. No fine adjustments. Nothing to get out of order. Ideal for refinery service, which explains why so many are used in modern refineries. We guarantee full satisfaction.

Patented



Ask for list of refiners using the CAMPBELL.

ATLAS VALVE COMPANY
REGULATING VALVES FOR EVERY SERVICE
275 South St., Newark, N. J.

Clip this to your letterhead, check the items in which you are interested, and we will gladly send data. No obligation.

- ☐ The Campbell Boiler Feed Water Regulator
- ☐ Reducing Valves
- ☐ Damper Regulators
- ☐ Exhaust Control System
- ☐ Temperature Regulators
- ☐ Pump Governors
- ☐ Float Valves
- ☐ Swing Joint Fittings
- ☐ Bronze Unions
- ☐ Thermostats
- ☐ Balanced Valves
- ☐ Control Valves

starting torque, high slip, adjustable speed, multi-speed, or other desirable characteristics that can be built into separate motors.

5 Electrode for Manganese Welding

GENERAL ELECTRIC COMPANY

General Electric Company, Schenectady, New York, announces a new coated electrode for manganese welding designated as Type-W-85 which finds its principal application in the building up of worn manganese steel castings to original dimensions and in repair of such parts.

According to the manufacturer, the new electrode has several outstanding features, among which are the following:

1. Reliable welds can be made by relatively unskilled operators.

2. When the rod is melted in the atmosphere and applied to ferrous metal articles, it exhibits the essential characteristics of standard heat-treated manganese steel, that is, toughness, ductility, and surface hardening under cold working. The nickel content overcomes any tendency of the metallic manganese content of the rod to oxidize and prevents brittleness under slow cooling.

3. No quenching of the weld-metal is necessary. The nickel successfully "carries" the relatively high carbon without effecting the ease of welding and the high carbon, in turn, gives excellent wearing qualities to the weld.

4. The electrode is furnished with a coating which has a high arc-sustaining property, making the wire readily adaptable to both a-c. and d-c. welding.

6 Nickel-Clad Steel

INTERNATIONAL NICKEL CO & LUKENS STEEL CO.

International Nickel Company and Lukens Steel Company, Coatesville, Pennsylvania, announce a duplex steel called nickel-clad, which is a hot-rolled bi-metal made up of a light layer of pure, solid nickel bonded to a heavy layer of flange quality steel. The nickel layer, which can be of variable thickness as desired up to 20 per cent of the total plate thickness, provides the corrosion-resistance and other advantages of pure, solid nickel construction without prohibitive price in heavy units of equipment.

Up to the present time, nickel-clad steel has been available only in the regular hot rolled finish, the nickel surface of which carries the tightly adherent nickel oxide film, dark olive brown in color. This nickel oxide finish is formed during the rolling of the bi-metal at high temperatures, and is somewhat similar to the finish on standard hot-rolled steel plates. While this type of finish, due to the excellent corrosion resistant properties of the nickel oxide itself, will continue to be produced, a new and finer finish is now available.

With the new finish, classified as "hot-rolled and cleaned," Nickel-Clad steel is free from the brown nickel oxide on the nickel side. The cleaning process gives the nickel a matt appearance nearly white in color, with surface superior to that produced by standard plate-mill practice. This "hot-rolled and cleaned" finish, however, should not be confused with the bright, lustrous surface of cold rolled and full finished solid nickel sheet, where refinement is obtained by cold rolling.

7 Fittings

KEY BOILER EQUIPMENT COMPANY

Key Coil Fittings

Key Boiler Equipment Company, East St. Louis, Illinois, announces its new series 6500 fittings for use on cracking stills, tube stills and condenser coils.

These fittings are attached to the tubes or pipes by means of differential thread sleeve couplings, which eliminate the necessity of rolling the tubes into the fittings. Convenient access to tubes for cleanout or inspection is provided for by closure plates with tapered joints. These closure plates are equipped with deflectors to provide full stream line flow through the fittings.

8 Gate Valve

SHAND & JURS COMPANY

Shand & Jurs Company, Berkeley, California, announces a new gate valve in which the bronze disc is installed through the flow passage. Two sets of opposed threads operate to lift the disc twice as fast as the stem. The disc is of the self-aligning type and the disc seats are integral with the flanged or threaded ends. Lapping of seats is easily accomplished, according to the manufacturer.

The valve is very light; weighing six pounds for aluminum and 13 pounds for bronze construction in the 2½-inch size.

Many connection arrangements can be

made with the same valve by means of the interchangeable feature. For example: both ends can be flanged, or both threaded with either male or female threads; one end can have flange while other has standard male fire threads with chained cap.

9 Flow Meter

BROWN INSTRUMENT COMPANY

Brown Instrument Company, Philadelphia, Pennsylvania, announces a new mechanical flow meter line in a number of combinations including: square root and evenly divided charts, automatic planimeter, multipen, flow, pressure, temperature, compensation for pressure and temperature, and automatic control and recording.

This new line of mechanical flow meters is featured by a simple-direct, lever-actuating mechanism, a large, powerful float, a pressure tight bearing with a grease reservoir, a series of range tubes that permit changing the range of the meter without disturbing the orifice, and by a type of construction and assembly whereby the manometer may be taken apart and cleaned in the field without altering the calibration.

The instrument mechanism is built into a die cast aluminum case which is attached to the manometer assembly by means of a three armed bracket that also supports the high and low pressure chambers of the manometer. The two chambers are connected by means of a U-tube below them. The construction is such that it is possible to drain the mercury from the manometer, reassemble same, add enough mercury to bring the pen to zero, and calibration will remain the same.

10 Scales

THE KRON COMPANY

The Kron Company, Bridgeport, Connecticut, has announced completion of the re-designing the line of automatic dial scales, which includes portable and dormant platform scales, bench scales, hanging pan scales, track scales, hopper scales, crane scales, and others.

Design of the indicating mechanism has been changed and greatly simplified. The number of bearings in the mechanism has been reduced to eight, six of which are high grade ball bearings, specially designed for the scale mechanism application. The advantage obtained in this application is the fact that all bearings in the scale mechanism are supported in every direction. The sector and pinion design is such that no variation is possible in the mesh of the gearing, which makes for constant accuracy.

A further development which makes for easier and more accurate readings is a device for absorbing vibration in the installation which might be transmitted to the scale pointer. This non-vibrating sector in no way affects the accuracy of the scale, but rather increases the efficiency of the mechanism inasmuch as the pointer will not vibrate and consequently can be much more easily read.

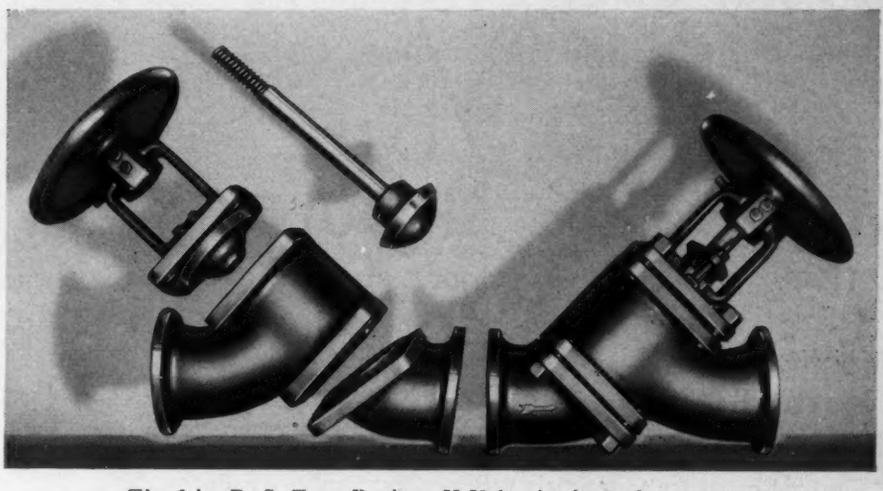
The dial head is sealed to prevent entrance of dust and moisture which might affect the scale mechanism. The dial head is also arranged to swivel 360 degrees so that it may be turned to allow accurate reading from any direction.

John Huntington Polytechnic Institute, Cleveland, Ohio, in cooperation with The Lincoln Electric Company, will conduct several welding courses during the winter.

The courses consist of a week's intensive work, six days being spent in the operator's training school of The Lincoln Electric Company. Each evening from Monday to Friday a lecture on designing for arc welded construction is given at John Huntington Institute.

Enrollment is limited to 30 men and applicants must be college graduates in engineering or have equivalent practical experience. Instruction is given in the operation of the arc so that the designer will be thoroughly familiar with the problems of arc welding from a practical or operator's standpoint.

Further information concerning the course and the dates on which it will be offered may be secured from Alfred Mewett, Dean, John Huntington Polytechnic Institute, Cleveland, Ohio, or E. W. P. Smith, Consulting Engineer, Box 683, Cleveland, Ohio. This course should not be confused with the four weeks' operators' training course which is operated continuously by The Lincoln Electric Company.



The 3-in. R. S. Type Durimet Y-Valve is shown here assembled and with parts separated ready to assemble.

A NON-CORROSIVE VALVE FOR STANDARD EQUIPMENT

Here is a valve that you can adopt for standard equipment and worry no more about the corrosive action of acids, caustics, acid sludges and hot or cold sulphur-bearing oils.

It is built of Durimet, a nickel-chrome-silicon steel which can be used with comparatively high pressures and high temperatures. The reversible seat may be reversed or renewed without removing the valve. The disc is free floating, which permits a new seating each time the valve is used.

Made in 1, 1½, 2, 3, 4 and 6-inch sizes. Plant superintendents tell us they find it economical to equip with Durimet valves due to savings in replacement, elimination of irritating delays, and high salvage value of used Durimet equipment.

THE DURIRON COMPANY, INC.

412 N. Findlay St., Dayton, Ohio

DURIMET

ITEMS ABOUT MANUFACTURERS

Worthington Pump and Machinery Corporation recently announced the appointment of Hugh Benet as manager of its Harrison, New Jersey Works. Since 1927, when Mr. Benet became associated with the Worthington organization, he has served as manager of the Corporation's Holyoke, Massachusetts works.

McAlear Manufacturing Company, 1901 South Western avenue, Chicago, Illinois, makers of pressure and level control equipment, has secured the services of D. B. Kelley to head the refinery division. Mr. Kelley is well known throughout refining circles, having been general superintendent of the American Refinery at Wichita Falls, Texas, and superintendent of Globe Refining Company at Lamont, Illinois.

Leader Industries, Inc., Decatur, Illinois, recently made additions to its staff and expanded activities in the belief that business is improving and that it will be able to close a volume of business in excess of that secured during recent years. Dr. E. H. Leslie, Leslie Laboratories, Ann Arbor, Michigan, as technical director will be in charge of all research and development, and with his staff will study new ideas, analyze processes and equipment lay-outs to insure their practical, economical usefulness. F. M. de Beers, formerly head of Swenson Evaporator Company, will be in charge of the process machinery and equipment division, and will be assisted by E. C. McDonald. J. B. Wood has been added to the staff as sales engineer. A planning and financial service department will cooperate with those whose projects are self-liquidating, and an associated board of technical experts in specialized fields is now being assembled.

Maintenance Engineering Corporation, Houston, Texas, announces its representation of the Emil Greiner Company, New York, New York, manufacturers of instruments, laboratory glassware and apparatus. A complete line of instruments and glassware will be carried in Houston stock. R. E. O'Neill, sales representative of the Maintenance Engineering Corporation, will have complete charge of this account.

Goslin-Birmingham Manufacturing Company, announces that Colonel George M. Morrow, Jr., has been elected president to succeed the late Julius Goslin. Colonel Morrow was for the past several years vice president of the company, in charge of the two plants at Birmingham, Alabama. The company is a consolidation of the former Birmingham Foundry & Machine Company and the Joubert & Goslin Foundry Company.

The Bristol Company, Waterbury, Connecticut, announces the establishment of a factory at London, England, under the name of Bristol's Instrument Company Limited. Howard H. Bristol, president of the Bristol Company, is chairman of the board of directors, and Alexander L. Dugon, of J. W. & C. J. Phillips, Ltd., is vice chairman and managing director. The plant is located at 144 Pomeroy Street, New Cross, London, and consists of an office building and a new two story factory building of modern construction. The factory is completely equipped with machinery, tools and testing equipment, and with British employes especially trained and skilled in the art of instrument making. It is prepared to manufacture and service the complete line of Bristol's indicating, recording and controlling instruments.

W. E. O'Meilia, 1832 East 16th street, Tulsa, now is sales representative in Oklahoma for Magnus Chemical Company, Inc., of Garwood, New Jersey. O'Meilia formerly was connected with Westcott and Greis and specialized in oil industry equipment.

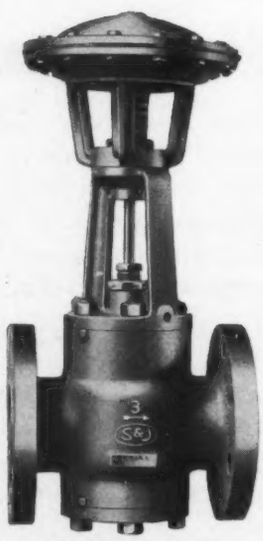
Magnus Chemical Company, Garwood, New Jersey is represented in Oklahoma by W. E. O'Meilia, 1832 East 16th street, Tulsa. O'Meilia formerly was connected with Westcott and Greis.

YOU SHOULD KNOW more about these outstanding CONTROL DEVICES

Positive throttling action is obtained through the use of S & J Liquid Level Controls in conjunction with S & J Diaphragm Valves. The Master Control has been especially constructed for extremely light buoyancy to maintain very sensitive control conditions. Both Junior and Master Liquid Level Controls are adapted for use with remote electrical signal lights. Can be furnished without the pot for direct mounting on manhole cover plate. Sizes to accommodate dimensions of open nozzle on container. Made for 50, 150, 300, 450 and 1000 pound pressures; higher pressures on order.

The new S & J Diaphragm Valve has many important improvements, including: Low resistance to flow; new gland design with lantern providing means for proper lubrication; either reverse or direct acting by merely reversing assembly, and without any additional parts. Greater protection for diaphragm against over-heating. Finest adjustments of control for such applications as: Level control, temperature control, pressure control and flow control. Used wherever a diaphragm or motor valve is required.

We also manufacture a large number of other products for refinery and tank farm requirements. All S & J products are built carefully for the most exacting requirements, and for a long trouble-free service. Send for Bulletin No. 52 for further information.



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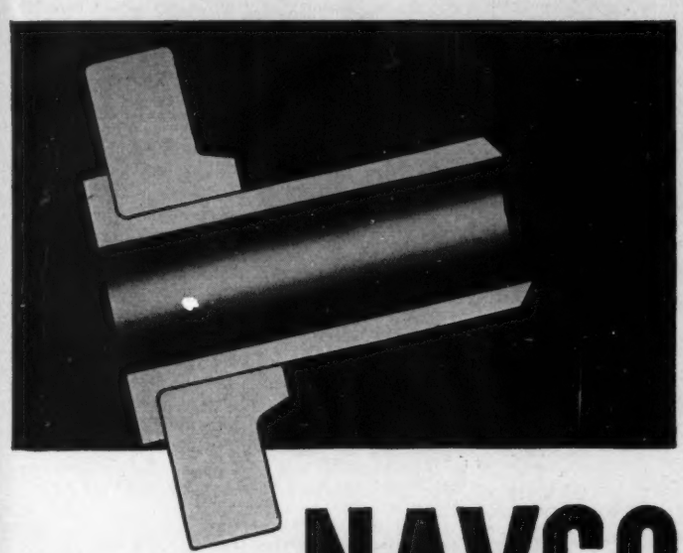

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No longer is it necessary to use a solid welding flange wherever a flanged connection is required in welded pipe lines. The new Navco Welding Stubs are now available in a complete range of sizes from ½" to 24" and for all operating conditions. • With their loose flanges, they entirely eliminate the lining up of bolt holes, one of the most troublesome and costly operations necessary where solid welding flanges are use. • They are fabricated and machined with the greatest of care and accuracy and provide a permanent and trouble proof connection for almost every kind of service. • Whether you are installing a long gas main or making repairs to a leaky joint, Navco Welding Stubs will materially reduce erection and maintenance charges. Write for details and prices.

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In acid treating, caustic washing, hypochlorite or doctor sweetening water washing and analogous processes, the use of Turbo-Treaters:

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2 Controls dispersion to an exact degree, avoids undesired emulsions.

3 Makes degree of dispersion independent of throughput.

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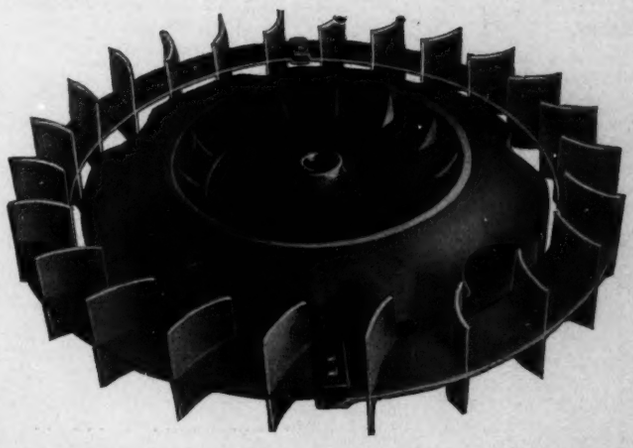
5 Economizes on treating agents.

6 Effects great saving in power.

7 Is reasonable in first cost.

Turbo-Treaters are operating with marked success in many well-known refineries, on everything from casinghead gasoline to heavy, cold lubricating stocks.



Turbo-Treaters (patents pending) are designed to meet specific requirements. One of the types of Turbo-Impellers and deflecting rings with CURVED (patented) blades, important elements in controlling and speeding the mixing of liquids with other liquids, solids or gases.

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CATALOGS . . . BULLETINS

Helpful Publications Which Manufacturers Will Be Glad to Send Free for the Asking

Sieves

The Newark Wire Cloth Company, 351-365 Verona Avenue, Newark, New Jersey, has issued a six-page folder which is devoted to two products: the new End-Shak testing sieve shaker and the U. S. standard and A.S.T.M. standard cornerless testing sieves.

Stationary Diesels

Atlas Imperial Diesel Engine Company, Oakland, California, has available for distribution a very attractive, 32-page illustrated booklet devoted to stationary Diesel engines, with illustrations and descriptions of some used for drilling and pumping.

Pumps

Goulds Pumps, Incorporated, Seneca Falls, New York, announces availability of an 11-page illustrated bulletin, No. 202, covering centrifugal pipe line pumps.

Shand & Jurs Sales Company, Denver, Colorado, announces appointment of the following representatives: Earle A. Mann, 53 West Jackson Boulevard, Chicago, Illinois; C. E. Murphy, 415 Midland Bank Building, Cleveland, Ohio; and T. F. Going Corporation, Milwaukee, Wisconsin.

Air Preheater

The Air Preheater Corporation, Wellsville, New York, announces availability of a bulletin titled "Something New to Think About Before Buying the Next Boiler," which is devoted largely to functions of the Ljungstrom air preheater.

Electric Steam Generators

Commonwealth Electric and Manufacturing Company, 83 Boston Street, Boston, Massachusetts, announces availability of an illustrated bulletin devoted to description of miniature steam generators, electric heated, for producing small quantities of steam at high or low pressure, as required in processes and laboratories.

Pumps

De Laval Steam Turbine Company, Trenton, New Jersey, has issued for distribution a four-page illustrated catalog B-6 devoted to description of propeller pumps, which are axial flow pumps for handling relatively large volumes of liquids against comparatively low heads at high rotative speeds.

Anti-Acid Metal

Wheeling Bronze Casting Company, Wheeling, West Virginia, has for distribution a four-page folder describing the B & M Anti-Acid Metal, a metal formulated for the oil refinery industry to give maximum operating life at lowest cost under severe or complex corrosive conditions, both from a standpoint of pure corrosion, electrolytic corrosion, or a combination of both.

Surface Condensers

Ingersoll-Rand Company, 11 Broadway, New York, New York, announces availability of Bulletin Form 9227 on surface condensers. Features of condensers discussed include single and two-pass construction, heart-shaped shell, external air coolers, longitudinal steam distribution, and tube sheet arrangement.

Centrifugal Pump

De Laval Steam Turbine Company, Trenton, New Jersey, has for distribution reprints of an illustrated article titled "Efficient Suction Head for Centrifugal Pump Operation," by A. Peterson, which appeared in the August, 1932, issue of Power.

Packing

Garlock Packing Company, Palmyra, N. Y., general catalog B-1932, a 155-page book covering entire range of packing materials made by the company; including packing for rods, plungers, rams, shafts, pistons, and valves and sheet packing materials and gaskets of all types.

Chain Belt

Link-Belt Company, 910 So. Michigan Ave., Chicago, Ill., Catalog No. 1192, a 144-page catalog on steel power transmission chains made by the company, giving specifications, dimensions, strengths and prices on chains for elevating, conveying and power transmission.

Refractories

General Refractories Company, Philadelphia, has ready for distribution a collection of new folders and bulletins on Carbex silicon-carbide brick, and data on properties and uses.

Meter

Builders Iron Foundry, Providence, Rhode Island, announces availability of Bulletin 202 describing the Chronoflo meter, a device particularly adapted for telemetering over standard telephone circuits, giving continuous information at distant points concerning quantities and rates of flow, temperatures, pressures, positions and levels.

Meters

Bailey Meter Company, Cleveland, Ohio, announces availability of Bulletin 300, devoted to steam and water fluid meters of various types for high and low pressures.

Silicon Carbide Brick

General Refractories Company, Philadelphia, Pa., now has available interesting bulletins and folders on CARBEX silicon carbide brick. These bulletins describe in detail the characteristics of these brick and give actual illustrations of its application for boiler and industrial furnaces.

Rotary Displacement Pump

De Laval Steam Turbine Company, Trenton, New Jersey, announces availability of a bulletin describing the "IMO" rotary displacement pumps designed to operate quietly at high speeds, with capacities ranging from one half to 500 gallons per minute and for pressures up to 500 pounds per square inch.

Laboratory Equipment

Burrell Technical Supply Company, Burrell Building, Pittsburgh, announces availability of Catalog No. 78, an 88-page volume devoted to description of laboratory testing equipment of many types, oxygen solutions, solutions for carbon monoxide and other gas analysis solutions, charcoal.

Steam Traps

Armstrong Machine Works, Three Rivers, Michigan, announces availability of a new manual on steam trap engineering and containing complete information on the inverted bucket steam traps. Important chapters in the book include the following: Tables giving the actual dollars cost of various sized steam leaks and the effect of entrained air on heating temperatures; How to determine size of trap required for medium, high, or fluctuating pressures and extra large volumes of condensates; How to calculate the rate of condensation in the various types of equipment where steam is used; Condensate drainage systems; and Installation and maintenance of traps.

Hot Liquid and Reflux Pumps

Ingersoll-Rand Company, 11 Broadway, New York, announces availability of Form No. O-465-Q titled "Specifications Covering Cameron Single-Stage, Volute, Hot Liquid and Reflux Pumps."

Pipe Joints

Taylor Forge & Pipe Works, P. O. Box 485, Chicago, Illinois, has for distribution the second issue of "Taylor Forge," which contains a discussion of welded versus screwed joints.

Roots-Connersville-Wilbraham, manufacturers of blowers, pumps and meters, report largest volume of unfilled orders since last March. Orders booked during November exceeded total for the same month in 1931, this being the second comparative monthly gain for the current fiscal year over last.

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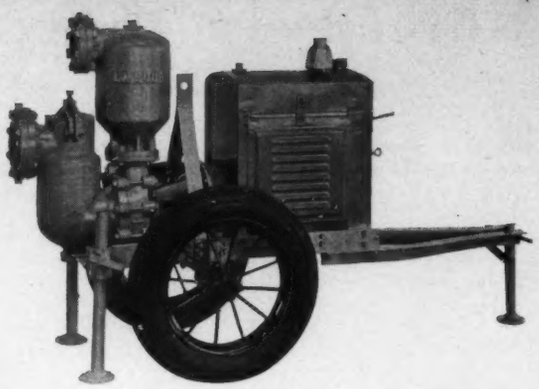

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The large capacity of centrifugals is combined with the positive self-priming of displacement pumps in the LaBour line of portable, gasoline engine driven units ranging from 1½″ to 5″ in size and from 100 to 800 G.P.M. at 20 ft. total head. They have countless uses around refineries, tank farms and pipe line stations, and are easily and quickly moved from place to place.

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All metals, including Monel, Stainless steel, and "Nichrome." All weaves. All sizes. Also all other wire cloths used in refineries. Whatever you need is very likely **stocked** by Newark and is available immediately.

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NEWARK WIRE CLOTH CO.
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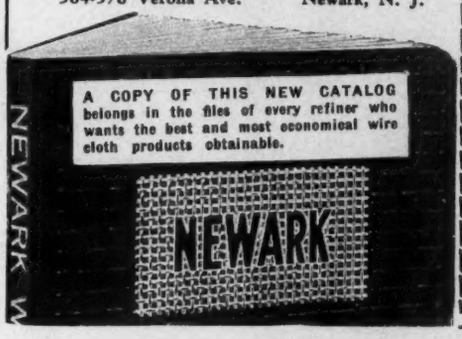
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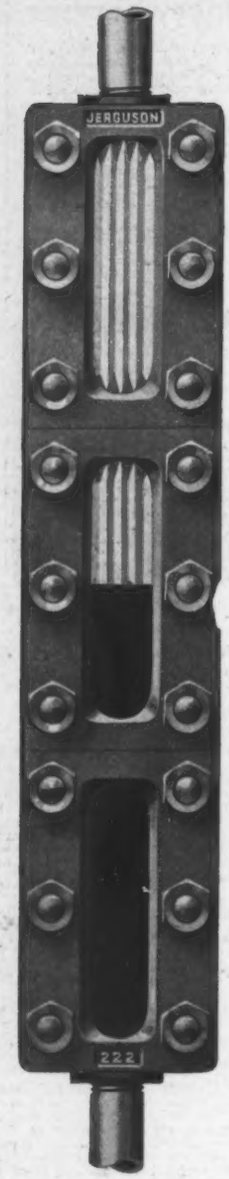

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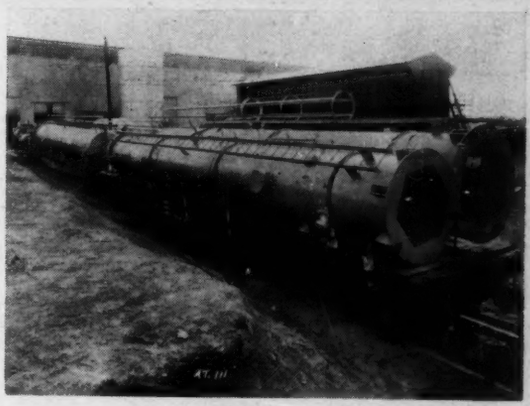

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925
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9 Important Features

Every oil man knows that by holding pressure on a liquid in a tank, he secures protection against evaporation losses. But . . . the *degree* of protection depends on the *efficiency* of the method used to secure it. That is why so many companies are standardizing on Plate 925 McDONALD ECONOMY TANK VENT. Never, we believe, has there been a vent that offered so many important features:

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Regularly furnished to release at pressures from 2 oz. to 2 lbs., but can be made up special for greater pressures. *To increase pressure on vent already in service, simply add weights which we furnish.*

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4 Fire Screen

Prevents back-flash.

5 Quick Gauging

—without interfering with vent or screen.

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EST. 1856
McDonald

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7 Fool-Proof

Gauge Hatch Cap closes *automatically*—no possibility of remaining open through neglect of gauger. Spring holds cap absolutely tight—prevents escape of vapor.

8 Locking

Permits use of padlock to prevent pilfering.

9 Construction

Body of high-grade gray iron; valve seats and poppets of non-corrosive metal; all other parts of high-grade bronze

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